

## Engineering Evaluation Summary State Street, Whitneyville, and Mill Rock Pump Stations

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### 1 Project Overview

Tighe & Bond visited the State Street, Whitneyville and Mill Rock Pump Stations on August 3, 2009 with staff from the Greater New Haven Water Pollution Control Authority (Authority). We reviewed existing mechanical and electrical equipment, buildings and ancillary systems with the Authority at each pump station. The Authority subsequently tasked Tighe & Bond to perform an Engineering Evaluation (Evaluation) of the State Street, Whitneyville and Mill Rock Pump Stations.

Our draft memorandum of November 2, 2009 summarized the project scope and background, existing pump station features, estimated pumping system hydraulics/capacities, upgrade alternatives, proposed recommendations and an implementation schedule. This updated memorandum incorporates the comments received by the Authority during and after our meeting on December 1, 2009. References used during this Evaluation are also summarized at the end of the memorandum.

#### 1.1 Scope of Work

The purpose of the Evaluation was to develop upgrade recommendations to extend the useful service lives of the three pump stations for the next 20 years. The Evaluation consisted of the following tasks:

1. Perform preliminary hydraulic estimates for the existing pumping systems.
2. Evaluate current and alternative pumping/piping system configurations.
3. Review electrical, HVAC and other ancillary systems.
4. Develop upgrade alternatives for each of the three pump stations.
5. Create supporting figures illustrating existing conditions and summarizing pumping/piping system upgrade alternatives.
6. Prepare a preliminary Opinion of Probable Cost (OPC) for each upgrade alternative.
7. Develop draft recommendations and an implementation schedule.
8. Present draft memorandum, summarizing the above, for review by the Authority.
9. Meet with Authority, incorporate review comments and update memorandum.

## 2 Background

Following is a brief overview of the locations and service areas of the State Street, Whitneyville and Mill Rock Pump Stations.

### 2.1 State Street Pump Station

The State Street Pump Station (SSPS) is located on State Street in the Town of Hamden. Its sewer service area, depicted in Figure 1, is comprised of 51,300 linear feet (lf) of asbestos cement (AC), vitrified clay (VC), reinforced concrete (RC) and polyvinyl chloride (PVC) collector sewers ranging in diameter from 6-inch to 18-inch. The SSPS sewer service



area also consists of 3,900 lf of 12-inch to 15-inch RC interceptor sewers, and 700 lf of 6-inch cast iron (CI) force main from the upstream Lovell Street Pump Station. The SSPS discharges to the south along State Street though 350 lf of 12-inch CI force main piping.

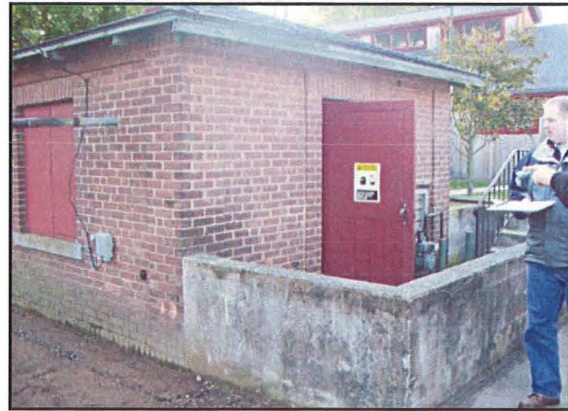
The SSPS was originally constructed in 1946. The building, which houses the drywell of the SSPS, is shown in the photo to the left. Over the years, some of the existing equipment has been upgraded. However, the major equipment, including pumps, piping, valves and generator are more than 20 years old. The

Authority intends to upgrade this equipment to extend the useful life of the SSPS.

### 2.2 Whitneyville Pump Station

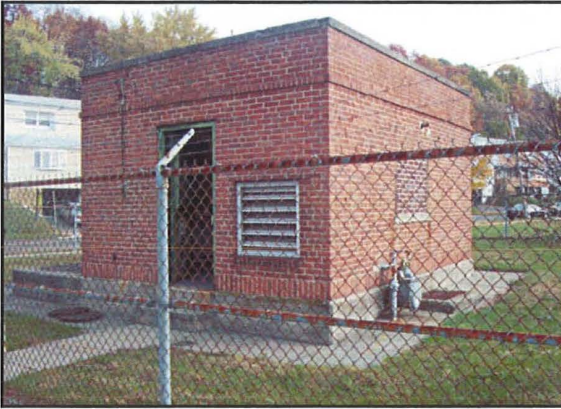
The Whitneyville Pump Station (WPS) is located on Whitney Avenue in the Town of Hamden. The WPS sewer service area, shown in Figure 2, is comprised of 18,000 lf of AC, VC and CI collector sewers ranging in diameter from 8-inch to 15-inch. Approximately 2,300 lf of 30-inch to 36-inch RC pressure sewers also traverse the WPS sewer service area. The WPS discharges to the south along Whitney Avenue though 1,000 lf of 8-inch CI force main piping.

The WPS is located adjacent to the Whitney Museum, across from the Regional Water Authority's (RWA) Lake Whitney Water Treatment Plant (WTP). The WPS was originally constructed in 1930, and was upgraded in 1947 to accommodate a wetwell expansion. After flooding damaged electrical equipment in the upper level of the WPS in the 1980s, a floodwall just outside the building was added to provide additional flood protection. The photo to the right depicts the floodwall at the entrance to the WPS. Similar to the SSPS, the existing major equipment (pumps, piping, valves and generator) at the WPS is old and has exceeded its service life. Therefore, the Authority is interested in extending the life of the station by upgrading these systems.





## 2.3 Mill Rock Pump Station



The Mill Rock Pump Station (MRPS) is located at the intersection of Mill Rock Road and Winchester Avenue in the Town of Hamden. The MRPS sewer service area, illustrated in Figure 3, is comprised of 63,800 linear feet (lf) of AC, VC and PVC collector sewers ranging in diameter from 6-inch to 15-inch, together with 11,000 lf of 22-inch to 24-inch brick and VC interceptor sewers. A limited amount (125 lf) of small diameter (2-inch PVC) low pressure sewer is also present in the WPS sewer service area. The WPA discharges to the south along Winchester Avenue through approximately 525 lf of 8-inch CI force main piping.

The MRPS was constructed in 1951. The exterior of the MRPS is shown in the photo to the left. The existing major equipment (pumps, piping, valves and generator) has not been upgraded and are more than 20 years old. Similar to the SSPS and WPS, the Authority would like to upgrade these systems to extend the service life of the MRPS.

## 3 Summary of Existing Pump Station Features

Following is a list of existing features of the SSPS, WPS and MRPS that are summarized in Table 1. In some cases, limited information of existing system components was available. Several sources, which are cited in Table 1, were used to compile this information. The existing conditions are also shown in Figures S1 to S4 (SSPS), Figures W1 to W5 (WPS) and Figures M1 to M5 (MRPS):

- **Location:** Address; Town; Sewer Service Area
- **Configuration:** Station Configuration; Drywell Construction Material; Number of Levels in Drywell; Upper Level; Intermediate Level; Lower Level; and Drywell Electrical Rating Concerns
- **Wetwell:** Diameter of Incoming Gravity Sewer(s); Wetwell Construction Material; Wetwell Dimensions; and Active Wetwell Volume (up to Gravity Sewer Invert)
- **Pumps:** Pump Type, Total Number of Pumps; Number of Duty Pumps; Estimated Pumping Rate; Pump Speed; Pump Manufacturer; Pump Model; Estimated Peak Pumping Rate with Duty Pump(s); Pump Suction Piping Diameter; Pump Discharge Pipe Diameter; and Force Main Diameter
- **Motors:** Location; Size; Speed; Electrical Rating; Motor Nameplate Information; and Type of Starters
- **Pump Controls:** Enclosure(s); Pump Control Panel; PLC Model; SCADA; and Level Control
- **Instrumentation:** Flow Measurement; Building Intrusion; Fire Alarm; and Gas Detection in Drywell
- **Generator:** Size of Generator and Fuel Source
- **Building:** Equipment Housed in Building; Exterior Construction Material; Interior Construction Material; Type of Roofing; Potable Water System; Heating System; Ventilation in Drywell; and Dehumidification in Drywell

- Site: Fencing, Off-Street Parking; Paved Access Driveway; and Landscaping Features

## 4 Hydraulics

Although pumping system operation and maintenance manuals for the SSPS, WPS and MRPS were not available during this Evaluation, existing pumping system flow rates were estimated at each of the three pump stations using available resources. The hydraulic capacity estimates for each pumping system are based on existing observed pumping system flow rates. Based on input from the Authority, we understand that limited additional growth is expected within each pump station tributary area.

### 4.1 State Street Pump Station

During our site visit to the SSPS, pump nameplate information was not available. Therefore, other sources of information were used to estimate pumping rates. For example, our December 7, 2007 "Pump Station Standardization Opportunities" memorandum included a summary table for all of the Authority's pump stations. Similar to the attached Table 1, much of this information was provided by Authority staff. The data in this December 2, 2007 table lists a design pumping rate (2 pumps operating in parallel with a standby unit) of 1,420 gallons per minute (gpm) at a total dynamic head (TDH) of 16-feet. For two pumps in parallel, this translates to a unit pumping rate of approximately 710 gpm. A photo of one of the existing pumps is shown below.



As part of the Authority's recent SCADA upgrade project, externally mounted flow meters were installed on the pump discharge pipe headers for two of the three existing pumps. The third pump is not currently on-line. Data from the flow meters suggests that each pump discharges at a flow rate of approximately 500 gpm when only one unit is in operation. Both pumps had similar observed pumping rates.

Since pumping systems are generally designed to maintain a scouring velocity ranging from 2.0 to 3.5 feet per second (fps) in the force main, we also estimated the unit pumping rate in the 12-inch force main. This results in a calculated unit pumping rate in the range of 704 to 1,233 gpm. These calculated pumping rates are higher than the pumping rates observed via the flow meter data. It is possible that the force main was designed for full build-out and that smaller pumping units are currently in place. It is also possible that the existing pumping units are no longer discharging at their initial pumping rate due to age and wear.

Since the existing pump control panel and motor starters were recently upgraded as part of the Authority's SCADA project, we will attempt to specify replacement pumps compatible with the existing pump control panel. This will minimize impacts on the new control system and SCADA components. However, we recommend that each of the replacement pumps be minimally capable of discharging at least 500 gpm. We will also consider higher efficiency pumps to increase the existing pumping rate without exceeding the 10 hp motor size rating of the existing motor starters.



## 4.2 Whitneyville Pump Station

Pump nameplate information was not available at the WPS either, so available resources were used to estimate the current pumping rate. The table from the December 7, 2007 "Pump Station Standardization Opportunities" memorandum indicated a unit pumping rate of 400 gpm at a TDH of 31-feet.

We also reviewed the "Sewer System Evaluation Study/Infiltration and Inflow Analysis – Whitneyville Sewershed" by Milone & MacBroom, dated October 2, 2002. This report included 2002 flow data for the WPS. The observed average daily flow to the WPS was 70,000 gallons per day (gpd). This Report was completed prior to the construction of the RWA's Lake Whitney WTP. The 2002 report concluded that the WPS was at or near its peak pumping capacity. The existing flow meter at the WPS was not active during this project, so a unit pumping rate of 650 to 700 gpm was estimated via a drawdown test and pressure gauge readings. This estimated pump rate appears high and does not correlate well with the rest of the flow data presented herein.

In 2001 and 2002, Tighe & Bond was working with the RWA on the design of the Lake Whitney WTP and obtained flow data from the flow metering station at the New Haven/Hamden Town line, which has since been abandoned. It is our understanding that this meter vault measured the flow from the WPS force main discharge before it flowed into New Haven. This data indicated an average daily flow of 73,000 gpd, which is consistent with the average daily flow data observed during the 2002 Milone & MacBroom I/I project. A peak daily flow rate of 588,000 gpd, or 408 gpm, was also observed. The peak daily flow rate at the metering vault was the same each day, suggesting that the metering vault was likely recording the WPS force main discharge. This estimated pumping rate correlates well with the data presented in our October 5, 2007 memorandum.



Similar to the SSPS, we estimated the unit pumping rate at velocities ranging from 2.0 to 3.5 fps in the existing 8-inch force main. The corresponding calculated unit pumping rate range is 316 to 553 gpm. These calculated pumping rates are lower than the pumping rates estimated in the 2002 Milone & MacBroom Report. A photo of one of the existing pumps is shown to the left.

Similar to the SSPS, we will attempt to specify replacement pumps compatible with the existing pump control panel at the WPS. We recommend that each of the replacement pumps be minimally capable of discharging approximately 410 gpm, but we will also consider higher efficiency pumps to increase the existing pumping rate without exceeding the 10 hp size rating of the existing motor starters.

## 4.3 Mill Rock Pump Station

Pump nameplate information was not available at the MRPS. However, pumping system hydraulics were estimated using other available information, similar to the SSPS and MRPS analyses. The December 7, 2007 memorandum listed a design pumping rate of 360 gpm at a TDH of 20-feet.



A photo of one of the existing pumping units is shown to the right. The externally mounted flow meter at the MRPS showed highly variable flow rates ranging from 200 to 600 gpm, with an average pumping rate of approximately 300 gpm. A pumping rate of 316 to 553 gpm, corresponding to a scouring velocity ranging from 2.0 to 3.5 fps in the 8-inch force main was also calculated. This correlates well with our December 7, 2007 memorandum.



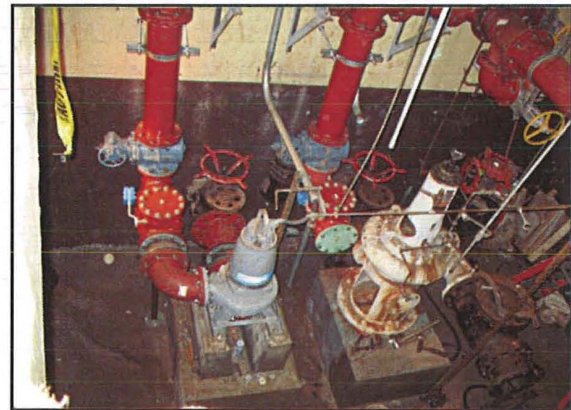
Similar to the WPS and the MRPS, we will attempt to specify replacement pumps compatible with the existing pump control panel at the MRPS. We recommend that each of the replacement pumps be minimally capable of discharging 300 to 360 gpm, but we will also evaluate higher efficiency pumps to increase the existing pumping rate without exceeding the 5 hp size rating of the existing motor starters.

## 5 Upgrade Alternatives

The SSPS and MRPS have nearly identical configurations. The WPS is also of similar configuration. Therefore, two upgrade alternatives were developed for each pump station. The "Alternative 1" concept involves the continued use of pumping units in the drywell. The "Alternative 2" concept involves an alternate pump configuration where submersible pumps are placed in the existing wetwell and the existing drywell is used as a valve pit for the pump discharge piping. Upgrades to other building and equipment systems, including corrective measures to improve drywell rating concerns, are also included in both Alternatives 1 and 2.

### 5.1 Alternative 1 - Current Pump Configuration

Alternative 1 upgrades at the SSPS, WPS, and MRPS are similar. Based on input from Authority staff, Alternative 1 includes dry-pit submersible pumps/motors, piping, and valves replaced in their current configuration. A photo depicted a similar pumping system replacement completed by Tighe & Bond is shown to the right. The existing vertical centrifugal pump and new dry-pit submersible pump are shown on the right and left sides of the photo, respectively. For the SSPS and the MRPS, the proposed pump discharge header includes a bypass pump header just outside the pump station. The WPS is already equipped with a bypass pump header. A magnetic flow meter will also be placed in the discharge header, together with an additional valves to facilitate operational flexibility. A replacement generator is also proposed in all of the Alternative #1 upgrades. Other building improvements including heating and ventilation, stairwells, windows and doors, and paint/coatings are also proposed. Alternative 1 concepts each include additional wetwell access hatches to improve access for cleaning the wetwells. The Alternative 1 concepts are illustrated in Figures S5 to S6 (SSPS), Figures W6 to W7 (WPS) and Figures M6 to M7 (MRPS).





## 5.2 Alternative 2 - Submersible Pump Configuration

Like Alternative 1, the Alternative 2 upgrades at the SSPS, WPS, and MRPS are similar to one another. Existing wetwells will be modified to accommodate submersible pumps, at-grade hatches, and pump removal systems (davit cranes). Alternative 2 includes the demolition of existing pumps, shafts, motors and new piping/valves in each drywell. Similar to Alternative 1, the proposed pump discharge header in each pump station will be modified as part of Alternative 2 to include a bypass pump header at the exterior of the pump station building (excluded the WPS). A magnetic flow meter will also be placed in the discharge



header, together with additional valves to facilitate operational flexibility. A replacement generator is also proposed in all of the Alternative #2 upgrades, along with other building improvements including heating and ventilation, stairwells, windows and doors, and paint/coatings. Because the wetwell modifications are outside the existing building, landscaping/lawn restoration will be required, and improved vehicle access is proposed at the SSPS and MRPS sites, since neither site has paved off-street driveways or parking. The Alternative 2 concepts also include additional wetwell access hatches to improve access for cleaning the wetwells. The Alternative #2

concepts are illustrated in Figures S7 to S8 (SSPS), Figures W8 to W9 (WPS) and Figures M8 to M9 (MRPS).

## 5.3 Preliminary Opinion of Probable Project Costs

Several parameters were evaluated including drywell electrical rating concerns, space limitations, constructability and maintainability. For the most part, Alternative #1 and Alternative #2 have similar benefits relative to these parameters. Based on input from the Authority and its Contract Operations group (OMI), this Evaluation focuses primarily operation and maintenance considerations in comparing Alternatives 1 and 2 at each of the three pump stations.

Our preliminary opinion of probable project cost for Alternatives SSPS-1, SSPS-2, WPS-1, WPS-2, MRPS-1 and MRPS-2 were updated following the December 1, 2009 meeting. This information is summarized in Table 2, and is shown in greater detail in the attached Tables 4 through 9. The costs presented are planning level estimates based on past projects and experience, and will be updated during the design phase.

**TABLE 2**

Preliminary Opinion of Probable Project Cost for each Alternative

<b>Alternative</b>	<b>Capital Cost</b>
SSPS-1	\$1,100,100
SSPS-2	\$980,100
WPS-1	\$639,400
WPS-2	\$698,000
MRPS-1	\$784,100
MRPS-2	\$824,200

Under the Alternative 1 concepts, maintenance access will be very similar to current conditions. However, for the Alternative 2 configurations, access to the wetwell will be increasingly important, since the pumps will only be accessible from outside. Therefore, additional site work will be needed for the Alternative 2 configurations.

## 6 Recommendations

### 6.1 Proposed Improvements

Based on the discussion during our meeting on December 1, 2009, the Authority prefers Alternatives SSPS-1, WPS-2 and MRPS-1 for the State Street, Whitneyville and Mill Rock Pump Stations, respectively. Our preliminary opinion of probable cost for the project (Alternatives SSPS-1, WPS-2 and MRPS-1), including engineering and contingency, is \$2,582,200. The components of the proposed improvements at each pump station are summarized in Table 2A below.

**TABLE 2A**

Summary of Proposed Improvements

<b>Upgrade Component</b>	<b>Pump Stations</b>		
	<b>State Street (SSPS-1)</b>	<b>Whitneyville (WPS-2)</b>	<b>Mill Rock (MRPS-2)</b>
Temporary Bypass Pumping System	X	X	X
Selective Demolition	X	X	X
Excavation/Backfill/Loam and Seed	X	X	X
Access Drive	X		X
Fencing Modifications	X		X
Seal Wetwell Openings in Drywell	X	X	X
Wetwell Access Hatch(es)	X	X	X
Wetwell Coating/Reinforcement	X	X	X
Staircase	X		X
Roofing	X	X	X
Doors and Windows	X	X	X
Painting	X	X	X



**TABLE 2A**  
Summary of Proposed Improvements

Upgrade Component	Pump Stations		
	State Street (SSPS-1)	Whitneyville (WPS-2)	Mill Rock (MRPS-2)
Dry Pit Submersible Pumping System	X		X
Submersible Pumping System		X	
Pump Intake Grinders	X		
Wetwell Mixer	X	X	X
Spare Rotating Assembly	X	X	X
Magnetic Flow Meter	X	X	X
Secondary Level Control	X	X	X
Pump Removal Device(s)	X	X	X
Drywell Piping/Valves	X	X	X
Bypass Pump Header	X		X
Electrical/Conduit/Wiring	X	X	X
Electrical Quick Connects	X	X	X
Outdoor Generator	X		X
Indoor Generator		X	
HVAC Improvements	X	X	X
<b>Total Opinion of Probable Project Cost</b>	<b>\$1,100,100</b>	<b>\$698,000</b>	<b>\$784,100</b>

In response to comments during and following our meeting on December 1, 2009, the proposed recommended plan includes the following additional project considerations:

- The Authority will televise the interior of the wetwells using a stick camera to observe the condition of the interior concrete surface. The design phase will include all three pump stations, but deductive alternates will be included in the bidding documents in the event that insufficient funds are available to construct all of the proposed improvements. In order to obtain preferred pumping equipment, the pumps may be procured by the Authority in advance of the General Bids.

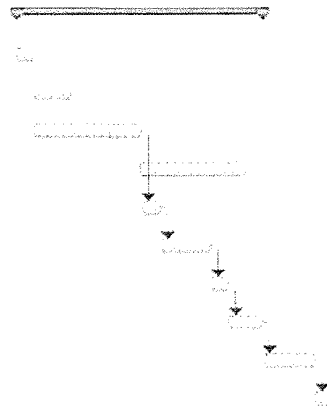
## 6.2 Implementation Schedule

Following the Authority's review of the draft memorandum and our coordination meeting on December 1, 2009, we incorporated the Authority's review comments via this final memorandum.

An updated project implementation schedule is presented in Table 3. Based on an design phase commencement in mid-January 2010, the design and permitting phases will be completed in August 2010, so that the project can be awarded in October 2010.

TABLE 3 - State Street, Whittierwide and Mill Rock Pump Station Improvements Project Schedule

Project Phase	Duration	Anticipated Start Date	Anticipated Completion Date	Nov	Dec	2010												2011																				
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug			
Authority Review	22 days	Mon 11/2/09	Tue 12/1/09																																			
Coordination Meeting	0 days	Tue 12/1/09	Tue 12/1/09																																			
Finalize Memo/Scope of Work	22 days	Tue 12/1/09	Wed 12/30/09																																			
Design and Permitting	151 days	Fri 1/15/10	Fri 8/13/10																																			
Meeting & Coordination	11 days	Fri 1/15/10	Fri 1/29/10																																			
Field/Haz Mat/Geotech Survey	22 days	Fri 1/29/10	Mon 3/1/10																																			
60% Design	56 days	Fri 1/29/10	Fri 4/30/10																																			
Permitting	56 days	Fri 4/30/10	Fri 7/29/10																																			
GNHWPCA Review	11 days	Mon 5/3/10	Mon 5/17/10																																			
90% Design	31 days	Tue 5/18/10	Tue 6/29/10																																			
GNHWPCA Review	11 days	Wed 6/30/10	Wed 7/14/10																																			
100% Design	22 days	Fri 7/15/10	Fri 8/13/10																																			
Bidding	31 days	Mon 8/16/10	Mon 9/27/10																																			
Award	11 days	Tue 9/28/10	Tue 10/12/10																																			
Active Construction Period	129 days	Wed 2/9/11	Mon 6/6/11																																			



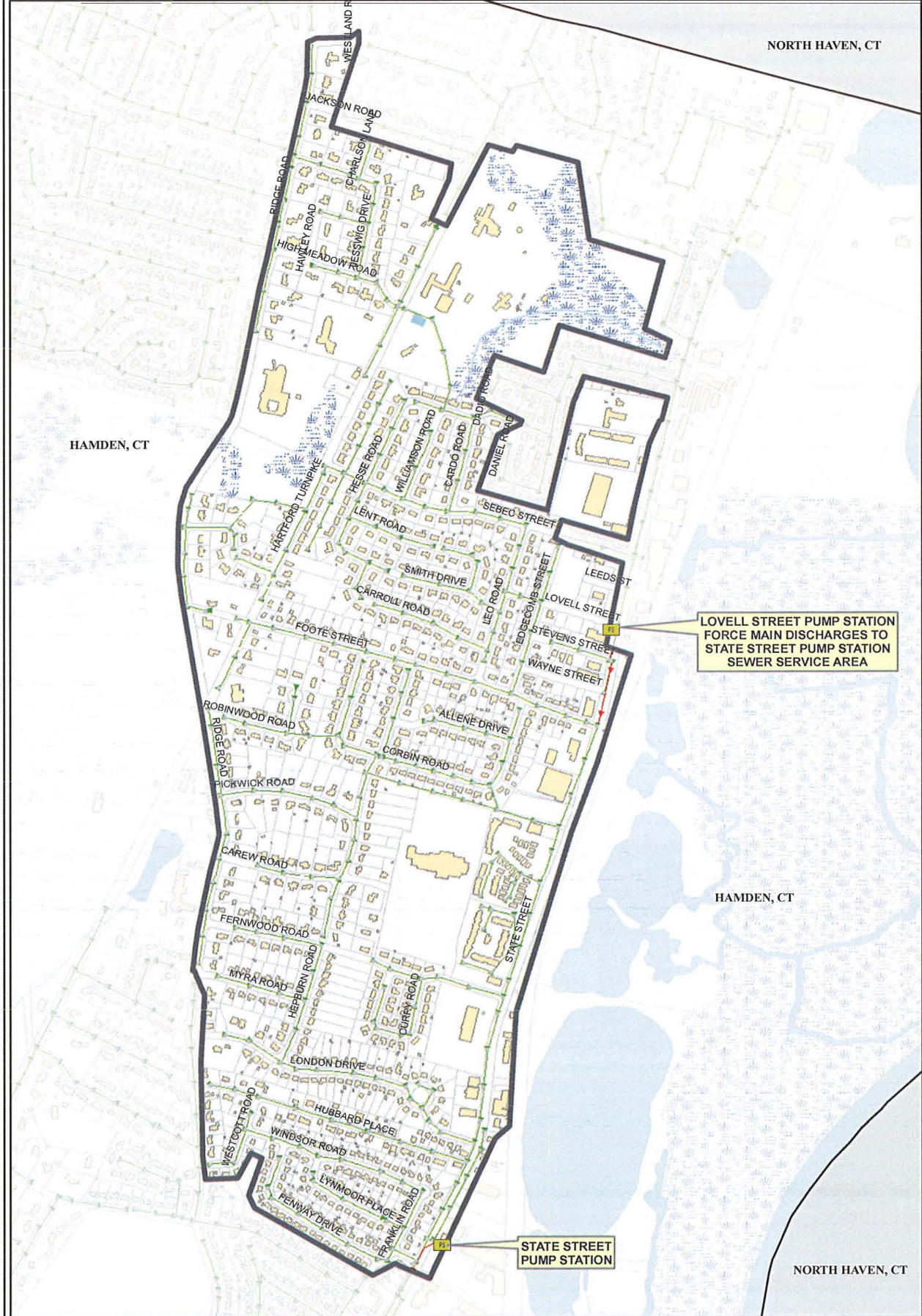


## 7 References

The following available resources were used to assist in the development of this Evaluation:

- Plans entitled "Sewage Pumping Station East Sewer District State Street", by the Town of Hamden Engineering Department, dated December 1946.
- Plans entitled "Alterations to Whitneyville Pumping Station", by the Town of Hamden Engineering Department, dated January 20, 1947.
- Information shown on the Drawing provided by C.J. Fucci Construction, Inc., dated November 2007.
- Plans entitled "Sewage Pumping Station For Mill Rock Road District", by the Town of Hamden Engineering Department, dated September 4, 1951
- Plans entitled "Remote Pump Station SCADA Upgrades and Nitrogen Removal Process Instrumentation", by CDM, dated April 2007.
- Report entitled "Sewer System Evaluation, Infiltration and Inflow Analysis, Whitneyville Sewershed", by Milone & MacBroom, dated October 2, 2002.
- Memorandum entitled "Old Chauncey Road Pump Station Engineering Evaluation", by Tighe & Bond, dated October 5, 2007.
- Memorandum entitled "Pump Station Standardization Opportunities", by Tighe & Bond, dated December 7, 2007.
- "Technical Report 16 (TR-16) - Guides for the Design of Wastewater Treatment Works", by the New England Interstate Water Pollution Control Commission, 1998 Edition.
- "Pumping Station Design, Second Edition", by Robert L. Sanks, Editor-in-chief, 1998.

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#### Legend

- P1 Pump station
- Collector Sewer
- Force main
- Pressure Sewer
- Sewer Manhole
- Whitneyville Sewer Service Area
- Building
- Parcels
- Stream
- Waterbodies
- ~ Wetlands

0 250 500 Feet  
1 inch = 500 feet

**FIGURE 2**  
**WHITNEYVILLE PUMP STATION**  
**SEWER SERVICE AREA**  
ENGINEERING EVALUATION  
HAMDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

November 2009

**Tighe & Bond**

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**Table 1**  
Summary of Existing Pump Station Features<sup>1</sup>

Pump Station Components/Features		State Street Pump Station	Whitneyville Pump Station	Mill Rock Pump Station
Location	Address	2141 State Street	911 Whitney Avenue	340 Mill Rock Road
	Town	Hamden	Hamden	Hamden
	Sewer Service Area	State Street	Whitneyville	Winchester/Putnam
Configuration	Station Configuration	Wet Pit/Dry Pit	Wet Pit/Dry Pit	Wet Pit/Dry Pit
	Drywell Construction Material	Concrete	Concrete	Concrete
	Number of Levels in Drywell (Including Building)	2	3	2
	Upper Level	Houses motors, generator, controls and SCADA system	Houses generator, controls and SCADA system	Houses motors, generator, controls and SCADA system
	Intermediate Level	N/A	Houses motors, force main discharge piping and wetwell access	N/A
	Lower Level	Houses pumps, valves, piping and sump	Houses pumps, valves, piping and sump	Houses pumps, valves, piping and sump
Wetwell	Drywell Electrical Rating Concerns	Class 1 Division 2, Group D, old level control access at interior of building	Class 1 Division 1, Group D, Wetwell access at interior of drywell	Class 1 Division 2, Group D, old level control access at interior of building
	Diameter of Incoming Gravity Sewer(s)	15"	8" (#1), 10" (#2)	10"
	Wetwell Construction Material	Concrete	Concrete (both)	Concrete (both)
	Wetwell #1 Dimensions	23' (L) x 18' (W) x 4.5' (H)	12' (L) x 4' (W) x 4.2' (H)	16' (L) x 7' (W) x 5' (H)
	Wetwell #1 Active Volume (to gravity sewer invert)	13,935 gal	1,510 gal	4,200 gal
	Wetwell #2 Dimensions	N/A	12' (L) x 10' (W) x 3.45' (H)	28' (L) x 18' (W) x 5' (H)
	Wetwell #2 Active Volume (to gravity sewer invert)	N/A	3,100 gal	18,850 gal (not used, valve between wetwells closed)
Pumps	Pump Type	Extended Shaft Vertical Centrifugal	Extended Shaft Vertical Centrifugal	Extended Shaft Vertical Centrifugal
	Total Number of Pumps	3	2	2
	Number of Duty Pumps	2	1	1
	Estimated Unit Pumping Rate	500 gpm	410 gpm	300 gpm
	Pump Speed	870 rpm	1170 rpm	Unknown
	Pump Manufacturer	Unknown	Aurora	Unknown
	Pump Model	F-M B5413	612 SF, 4X12	F-M B5412
	Estimated Peak Pumping Rate with Duty Pump(s)	750 gpm	410 gpm	250 gpm
	Pump Suction Piping Diameter	8"	5"	5"
	Pump Discharge Pipe Diameter	8"	6"	5"
Motors	Force Main Diameter	12"	8"	8"
	Location in Drywell	Upper Level	Intermediate Level	Upper Level
	Size	10 hp	10 hp	5 hp
	Speed	900 rpm, constant speed	1200 rpm, constant speed	Unknown rpm, constant speed
	Electrical Rating	240V, 3-Phase	240V, 3-Phase	240V, 3-Phase
	Nameplate Information	Unknown	U.S. Motor, Frame 887	Unknown
	Type of Starters	Rated for 28 full load amps	NEMA 1	NEMA 1
Pump Controls	Enclosure(s)	Explosion Proof	Explosion Proof	Explosion Proof
	Pump Control Panel	Pump Watch, Control Systems, Inc.	Pump Watch, Control Systems, Inc.	Pump Watch, Control Systems, Inc.
	PLC Model	Momentum	Momentum	Momentum
	SCADA	Radio Modem (#18)	Radio Modem (#16)	Radio Modem (#15)
	Level Control	Submersible pressure transducer	Submersible pressure transducer	Submersible pressure transducer
Instrumentation	Flow Measurement	2, Exterior Surface-Mounted	Abandoned, Not Functional	Exterior Surface-Mounted
	Building Intrusion	No	Yes	No
	Fire Alarm	No	Yes	No
	Gas Detection in Drywell	None	H <sub>2</sub> S, LEL	H <sub>2</sub> S, LEL
Generator	Size of Generator	25 kW	26 kW	25 kW
	Fuel Source	Natural Gas	Natural Gas	Natural Gas
Building	Equipment Housed in Building	Yes	Yes	Yes
	Exterior Construction Material	Brick	Brick	Brick
	Interior Construction Material	Brick	Brick	Brick
	Type of Roofing	Hip Roof, Clay Tiles	Wood Framed, Hip Roof, Asphalt Shingles	Flat Roof, Rolled Asphalt Membrane
	Potable Water	Yes	No	Yes
	Heating System	Electric Unit Heater	Electric Unit Heater	Electric Unit Heater
	Ventilation in Drywell	Pipe to Lower Drywell and Exhaust Fan	Pipe to Lower Drywell and Exhaust Fan	Pipe to Lower Drywell and Exhaust Fan
	Dehumidification in Drywell	No	No	No
	Chain Link Fence with Gate	Yes	No	Yes
	Off-Street Parking	No	Yes	No
Site	Paved Access Driveway	No	Yes	No
	Landscaping Features	Lawn	Lawn	Lawn

**NOTES:**

<sup>1</sup> The following resources were used to gather information used in this Table.

- Plans entitled "Sewage Pumping Station East Sewer District State Street", by the Town of Hamden Engineering Department, dated December 1946.
- Plans entitled "Alterations to Whitneyville Pumping Station", by the Town of Hamden Engineering Department, dated January 20, 1947.
- Information shown on the Drawing provided by C.J. Fucci Construction, Inc., dated November 2007.
- Plans entitled "Sewage Pumping Station For Mill Rock Road District", by the Town of Hamden Engineering Department, dated September 4, 1951
- Plans entitled "Remote Pump Station SCADA Upgrades and Nitrogen Removal Process Instrumentation", by CDM, dated April 2007.
- Report entitled "Sewer System Evaluation, Infiltration and Inflow Analysis, Whitneyville Sewershed", by Milone & MacBroom, dated October 2, 2002.
- Memorandum entitled "Old Chauncey Road Pump Station Engineering Evaluation", by Tighe & Bond, dated October 5, 2007.
- Memorandum entitled "Pump Station Standardization Opportunities", by Tighe & Bond, dated December 7, 2007.

Table 4  
Preliminary Opinion of Probable Cost  
State Street Pump Station Alternative SSPS-1  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 74,080
Temporary Bypass Pumping System	\$ 45,000
<b>Division 2</b>	
Excavation and Backfill (access hatches and bypass header)	\$ 15,000
Selective Demolition (3 pumps, pipe, stairs, roof & gen set)	\$ 30,000
Loam, Seed and Landscaping	\$ 7,500
Access Drive	\$ 15,000
Fence/Gate Mods	\$ 7,500
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 2,500
Wetwell Risers (2)	\$ 10,000
Wetwell Modifications (Coating and Reinforcing for Hatches)	\$ 35,000
Concrete Pump Pads (3)	\$ 12,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
Staircase - Conventional	\$ 30,000
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 35,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
<b>Division 9</b>	
Painting	\$ 17,500
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Dry Pit Submersible Pumps (3)	\$ 105,000
In-Line Grinders (3)	\$ 75,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (10")	\$ 10,000
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
Pump Removal System (Davit Crane)	\$ 7,500
<b>Division 15</b>	
Interior Piping (175 lf)	\$ 43,800
Exterior Bypass Pump Header	\$ 20,000
Valves (18)	\$ 45,000
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 30,000
Electrical Quick Disconnects (3)	\$ 30,000
HVAC Improvements	\$ 25,000
Outdoor Generator and ATS	\$ 45,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 814,900</b>
<b>Engineering, Permitting &amp; Contingency (35%)</b>	<b>\$ 285,200</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 1,100,100</b>



Table 5  
Preliminary Opinion of Probable Cost  
State Street Pump Station Alternative SSPS-2  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 66,000
Temporary Bypass Pumping System	\$ 40,000
<b>Division 2</b>	
Excavation and Backfill (access hatches and bypass header)	\$ 20,000
Selective Demolition (3 pumps, pipe, stairs, roof & gen set)	\$ 35,000
Loam, Seed and Landscaping	\$ 7,500
Access Drive	\$ 15,000
Fence/Gate Mods	\$ 7,500
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 2,500
Wetwell Risers (5)	\$ 25,000
Wetwell Modifications	\$ 45,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
Staircase - Conventional	\$ 30,000
Platform for Valve Access	\$ 20,000
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 35,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
<b>Division 9</b>	
Painting	\$ 15,000
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Submersible Pumps (3)	\$ 90,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (10")	\$ 10,000
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
Davit Cranes for Pumps (3)	\$ 15,000
<b>Division 15</b>	
Interior Piping (100 lf)	\$ 25,000
Exterior Bypass Pump Header	\$ 20,000
Valves (9)	\$ 22,500
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 30,000
Electrical Quick Disconnects (3)	\$ 37,500
HVAC Improvements	\$ 25,000
Outdoor Generator and ATS	\$ 45,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 726,000</b>
<b>Engineering &amp; Contingency (35%)</b>	<b>\$ 254,100</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 980,100</b>

Table 6  
Preliminary Opinion of Probable Cost  
Whitneyville Avenue Pump Station Alternative WPS-1  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 43,050
Temporary Bypass Pumping System	\$ 35,000
<b>Division 2</b>	
Excavation and Backfill (access hatch)	\$ 5,000
Selective Demolition (2 pumps, pipe, stairs, roof & gen set)	\$ 27,500
Loam, Seed and Landscaping	\$ 5,000
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 10,000
Wetwell Riser (1)	\$ 5,000
Wetwell Modifications (Coating and Reinforcing for Hatch)	\$ 25,000
Concrete Pump Pads (2)	\$ 8,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
None Anticipated	\$ -
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 30,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
Convert Window to Intake Louver	\$ 10,000
<b>Division 9</b>	
Painting	\$ 12,500
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Dry Pit Submersible Pumps (2)	\$ 70,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (6")	\$ 7,500
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
None Anticipated	\$ -
<b>Division 15</b>	
Interior Piping (50 lf)	\$ 12,500
Valves (6)	\$ 15,000
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 25,000
Electrical Quick Disconnects (2)	\$ 20,000
HVAC Improvements	\$ 25,000
Indoor Generator and ATS	\$ 40,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 473,600</b>
<b>Engineering &amp; Contingency (35%)</b>	<b>\$ 165,800</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 639,400</b>



Table 7  
Preliminary Opinion of Probable Cost  
Whitneyville Avenue Pump Station Alternative WPS-2  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 47,000
Temporary Bypass Pumping System	\$ 35,000
<b>Division 2</b>	
Excavation and Backfill (access hatches)	\$ 15,000
Selective Demolition (2 pumps, pipe, stairs, roof & gen set)	\$ 30,000
Loam, Seed and Landscaping	\$ 10,000
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 10,000
Wetwell Risers (3)	\$ 15,000
Wet Well Modifications	\$ 35,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
None Anticipated	\$ -
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 30,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
Convert Window to Intake Louver	\$ 10,000
<b>Division 9</b>	
Painting	\$ 10,000
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Submersible Pumps (2)	\$ 60,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (6")	\$ 7,500
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
Davit Cranes for Pumps (2)	\$ 10,000
<b>Division 15</b>	
Interior Piping (50 lf)	\$ 12,500
Bypass Pump Header	\$ 12,500
Valves (6)	\$ 15,000
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 25,000
Pump Disconnects (2)	\$ 20,000
HVAC Improvements	\$ 25,000
Generator and ATS	\$ 40,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 517,000</b>
<b>Engineering &amp; Contingency (35%)</b>	<b>\$ 181,000</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 698,000</b>

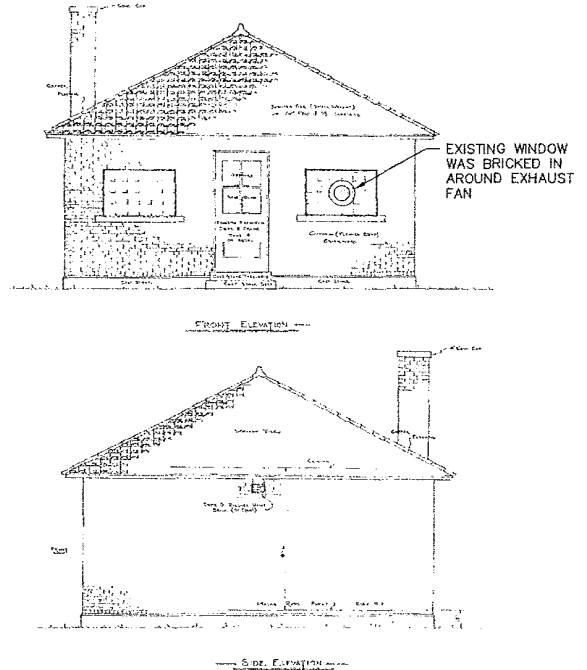
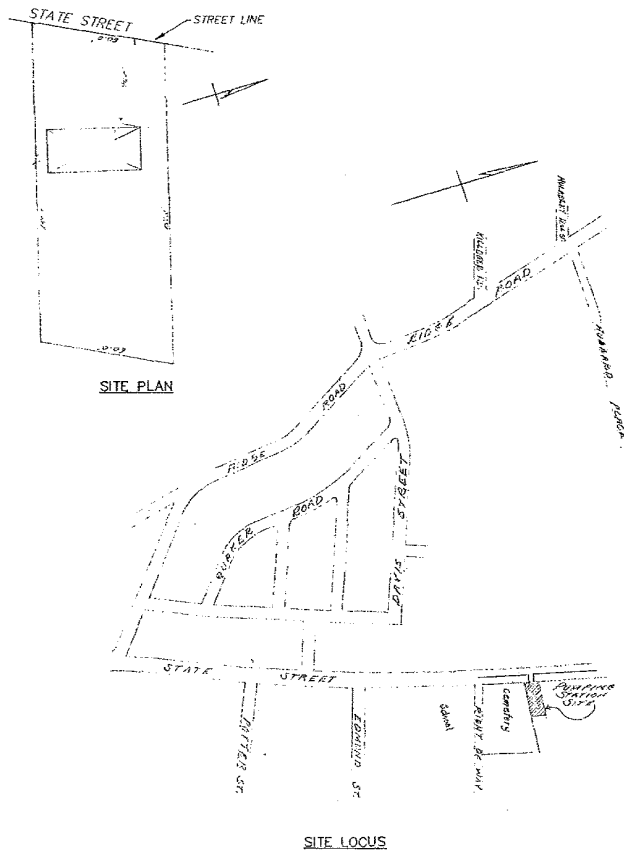
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Preliminary Opinion of Probable Cost  
Mill Rock Road Pump Station Alternative MRPS-1  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 52,800
Temporary Bypass Pumping System	\$ 30,000
<b>Division 2</b>	
Excavation and Backfill (access hatches and bypass header)	\$ 15,000
Selective Demolition (2 pumps, pipe, stairs, roof & gen set)	\$ 25,000
Loam, Seed and Landscaping	\$ 7,500
Access Drive	\$ 12,500
Fence/Gate Mods	\$ 7,500
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 2,500
Wetwell Risers (2)	\$ 10,000
Wetwell Modifications (Coating and Reinforcing for Hatches)	\$ 35,000
Concrete Pump Pads (2)	\$ 8,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
Staircase - Conventional	\$ 30,000
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 25,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
<b>Division 9</b>	
Painting	\$ 12,500
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Dry Pit Submersible Pumps (2)	\$ 70,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (8")	\$ 7,500
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
Pump Removal System (Davit Crane)	\$ 7,500
<b>Division 15</b>	
Interior Piping (100 lf)	\$ 25,000
Exterior Bypass Pump Header	\$ 20,000
Valves (8)	\$ 20,000
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 25,000
Electrical Quick Disconnects (2)	\$ 20,000
HVAC Improvements	\$ 25,000
Outdoor Generator and ATS	\$ 45,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 580,800</b>
<b>Engineering, Permitting &amp; Contingency (35%)</b>	<b>\$ 203,300</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 784,100</b>



Table 9  
Preliminary Opinion of Probable Cost  
Mill Rock Road Pump Station Alternative MRPS-2  
Updated on December 18, 2009

<b>Project Components</b>	<b>Estimated Cost</b>
<b>Division 1</b>	
Bonds, Insurance, and General Conditions (10%)	\$ 55,500
Temporary Bypass Pumping System	\$ 30,000
<b>Division 2</b>	
Excavation and Backfill (access hatches and bypass header)	\$ 17,500
Selective Demolition (2 pumps, pipe, stairs, roof & gen set)	\$ 30,000
Loam, Seed and Landscaping	\$ 7,500
Access Drive	\$ 12,500
Fence/Gate Mods	\$ 7,500
<b>Division 3</b>	
Seal Wetwell Opening in Building	\$ 2,500
Wetwell Risers (4)	\$ 20,000
Wetwell Modifications (Coating and Reinforcing for Hatches)	\$ 45,000
<b>Division 4</b>	
None Anticipated	\$ -
<b>Division 5</b>	
Staircase - Conventional	\$ 30,000
Platform for Valve Access	\$ 17,500
<b>Division 6</b>	
None Anticipated	\$ -
<b>Division 7</b>	
Roofing	\$ 25,000
<b>Division 8</b>	
Doors and Windows	\$ 10,000
<b>Division 9</b>	
Painting	\$ 10,000
<b>Division 10</b>	
None Anticipated	\$ -
<b>Division 11</b>	
Submersible Pumps (2)	\$ 60,000
Wetwell Mixer	\$ 25,000
Spare Rotating Assembly	\$ 5,000
<b>Division 12</b>	
None Anticipated	\$ -
<b>Division 13</b>	
Magnetic Flow Meter (8")	\$ 7,500
Secondary Level Control System	\$ 2,500
<b>Division 14</b>	
Davit Cranes for Pumps (2)	\$ 10,000
<b>Division 15</b>	
Interior Piping (100 lf)	\$ 25,000
Exterior Bypass Pump Header	\$ 20,000
Valves (8)	\$ 20,000
<b>Division 16</b>	
Conduit, Wiring, and Miscellaneous	\$ 25,000
Electrical Quick Disconnects (2)	\$ 20,000
HVAC Improvements	\$ 25,000
Outdoor Generator and ATS	\$ 45,000
<b>Opinion of Probable Bid Price =</b>	<b>\$ 610,500</b>
<b>Engineering &amp; Contingency (35%)</b>	<b>\$ 213,700</b>
<b>Opinion of Total Probable Project Cost =</b>	<b>\$ 824,200</b>



THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "SEWAGE PUMP STATION EAST SEWER DISTRICT STATE STREET" BY TOWN OF HAMDEN ENGINEERING DEPARTMENT, DATED DECEMBER 1946.

FIGURE S-1

STATE STREET PUMP STATION  
EXISTING SITE PLAN  
AND BUILDING ELEVATIONS

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

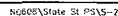
TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS

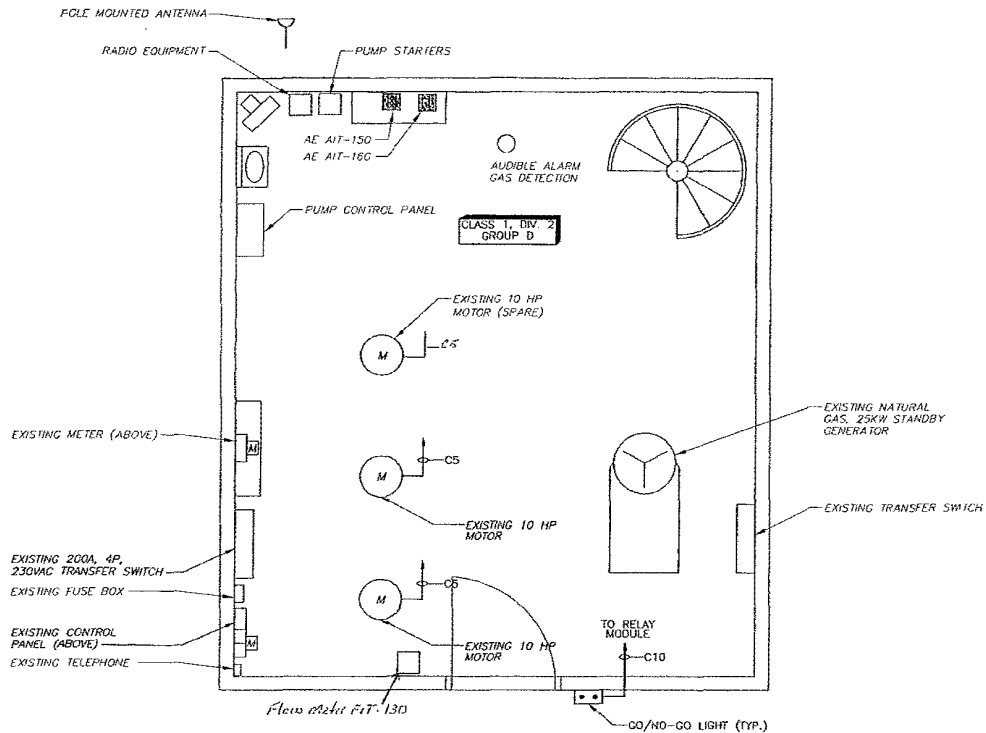
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OCTOBER 2009

NOBGE\State St PS\S-1







**PLAN**  
N.T.S.

THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "REMOTE PUMP STATION SCADA UPGRADES AND NITROGEN REMOVAL PROCESS INSTRUMENTATION" BY CDM, DATED APRIL 2007.

FIGURE S-3

STATE STREET PUMP STATION  
EXISTING BUILDING LEVEL

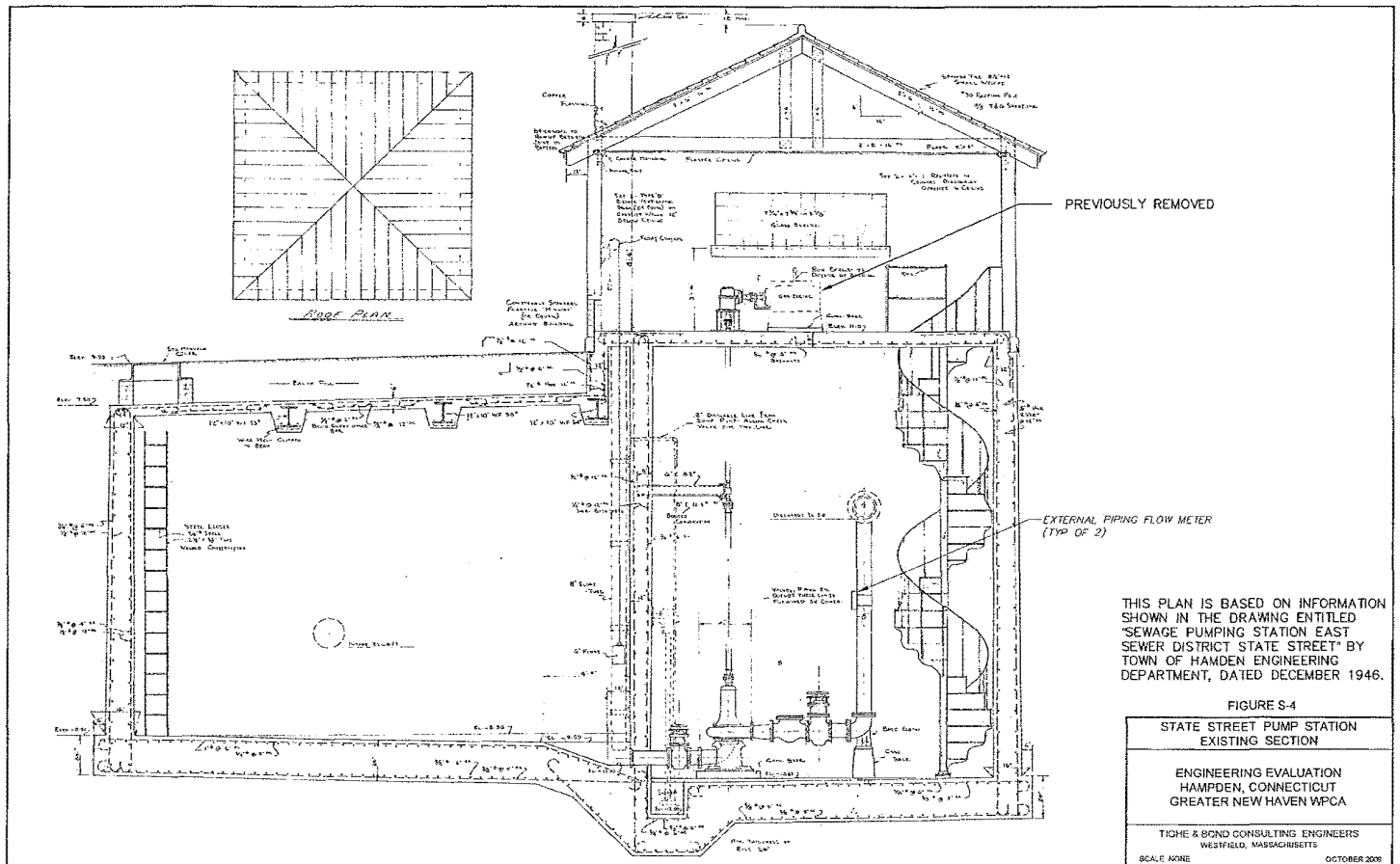
ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

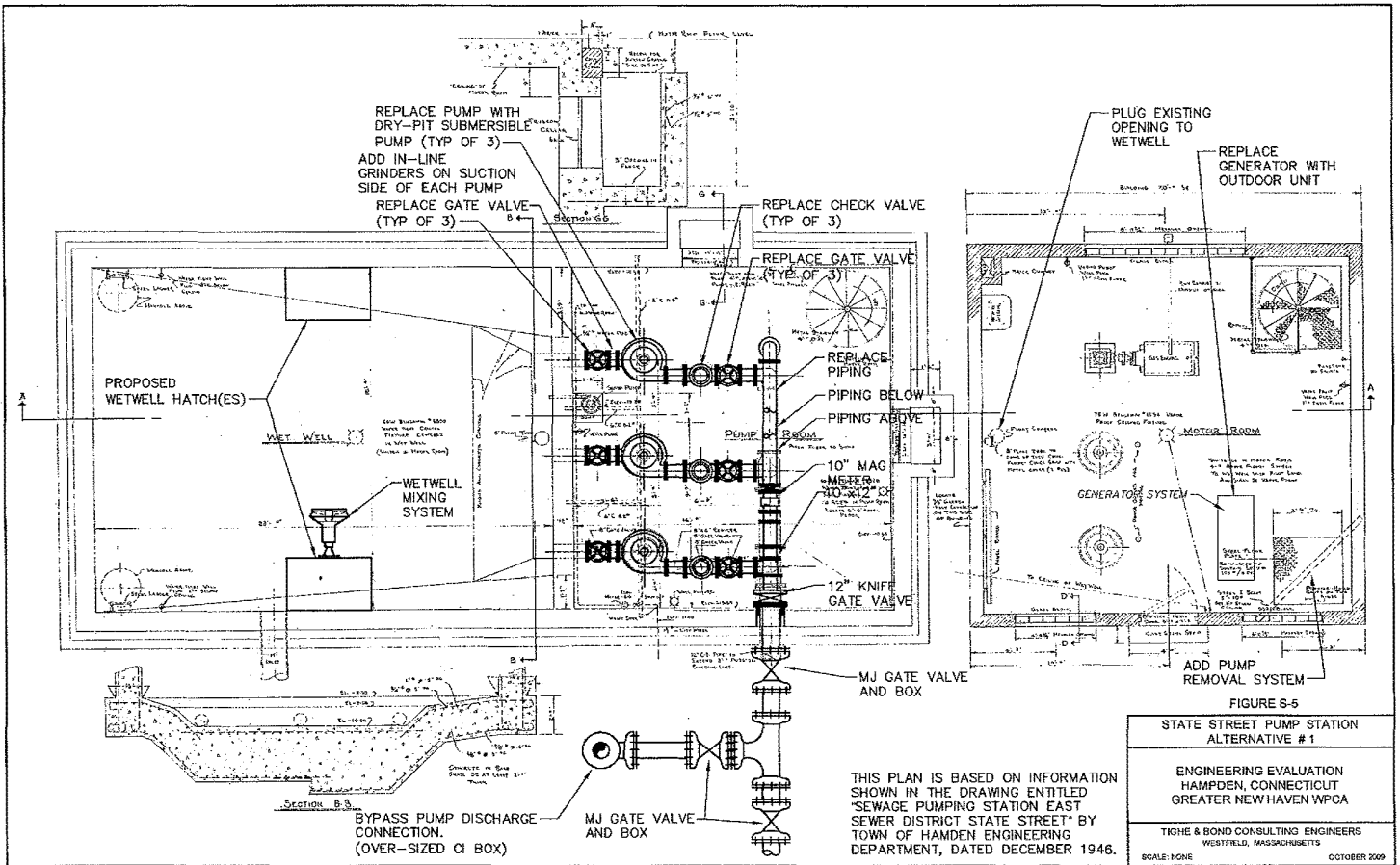
TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS

SCALE: NONE OCTOBER 2008

N:\2008\State St. PS\S-3

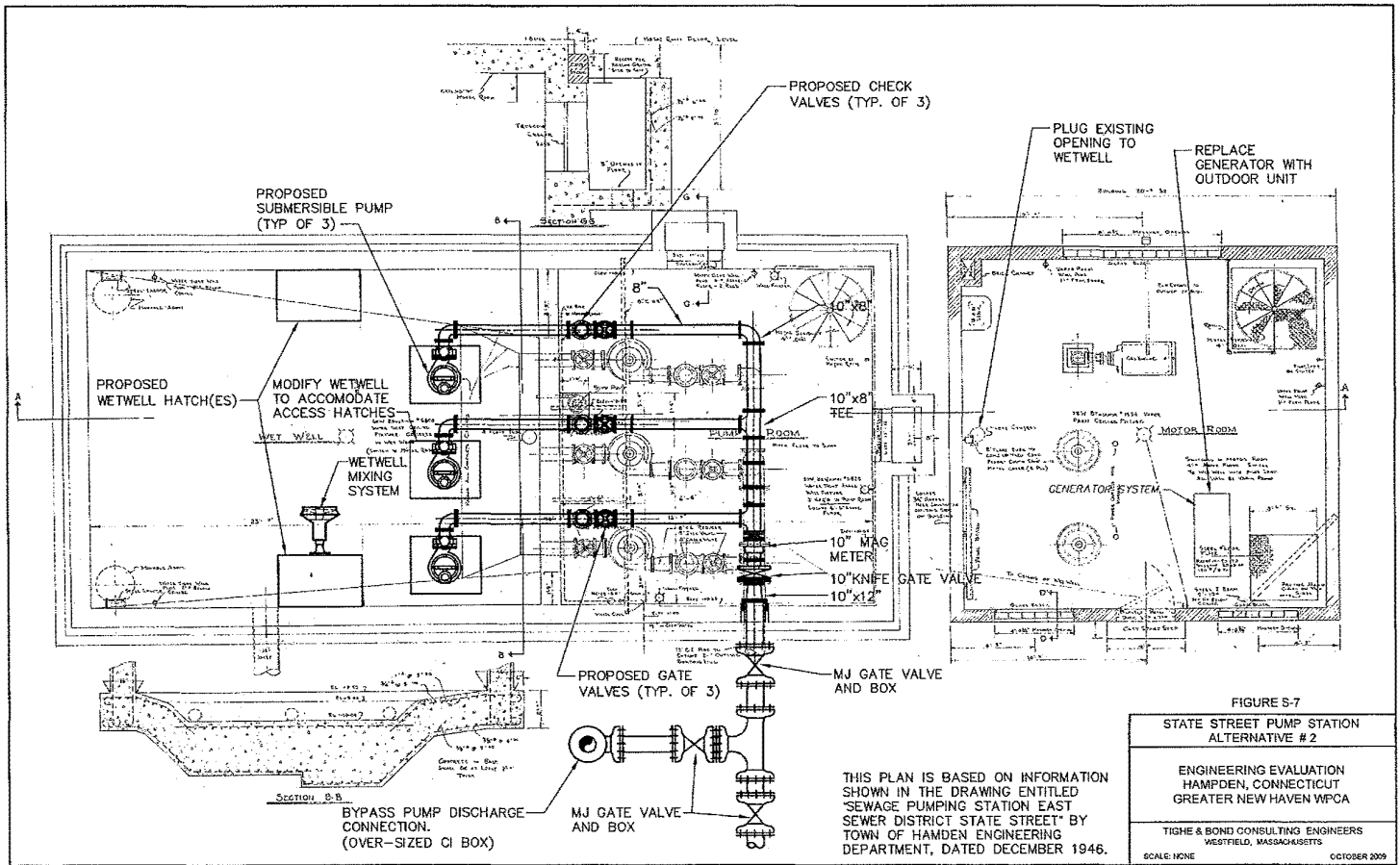




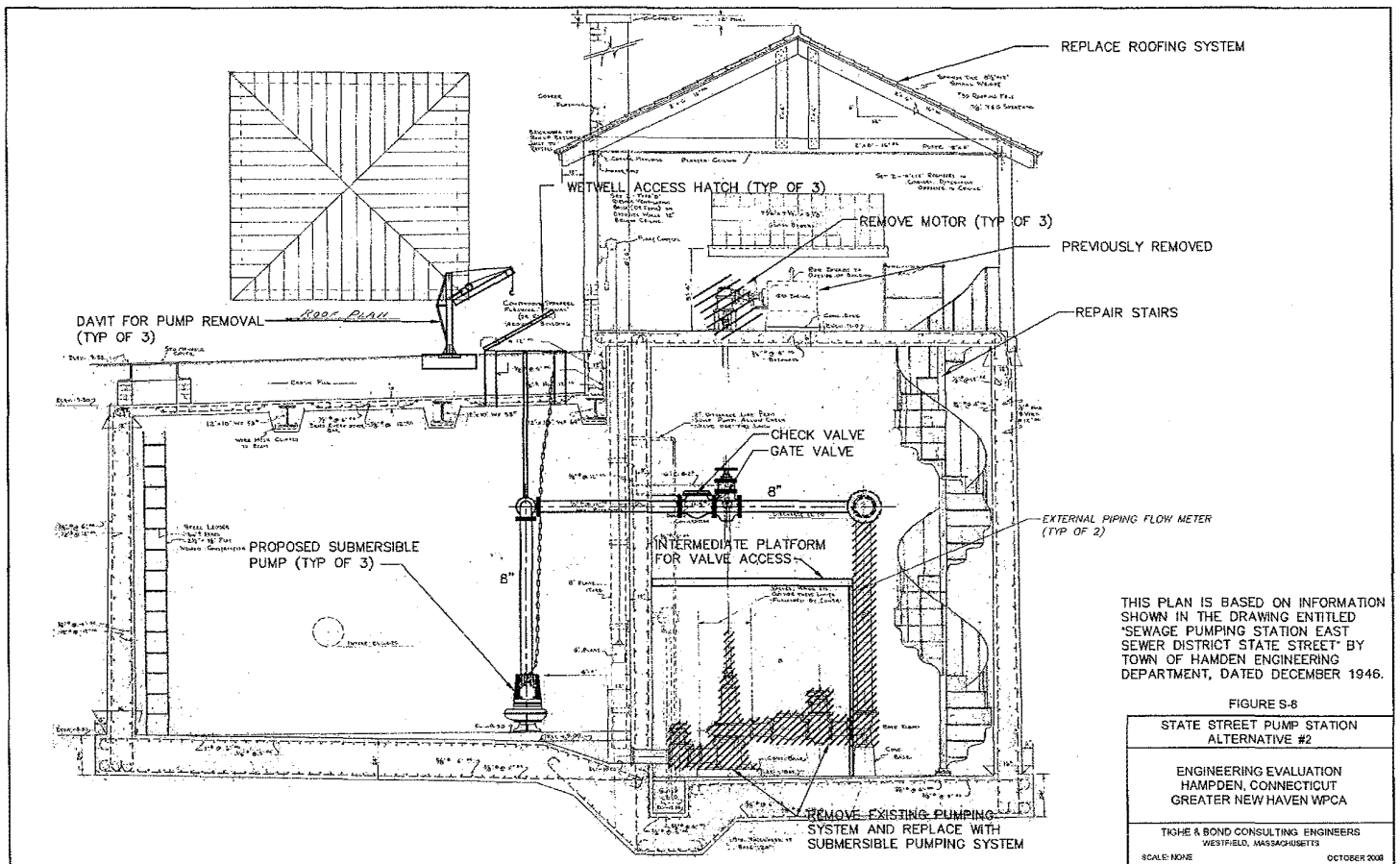


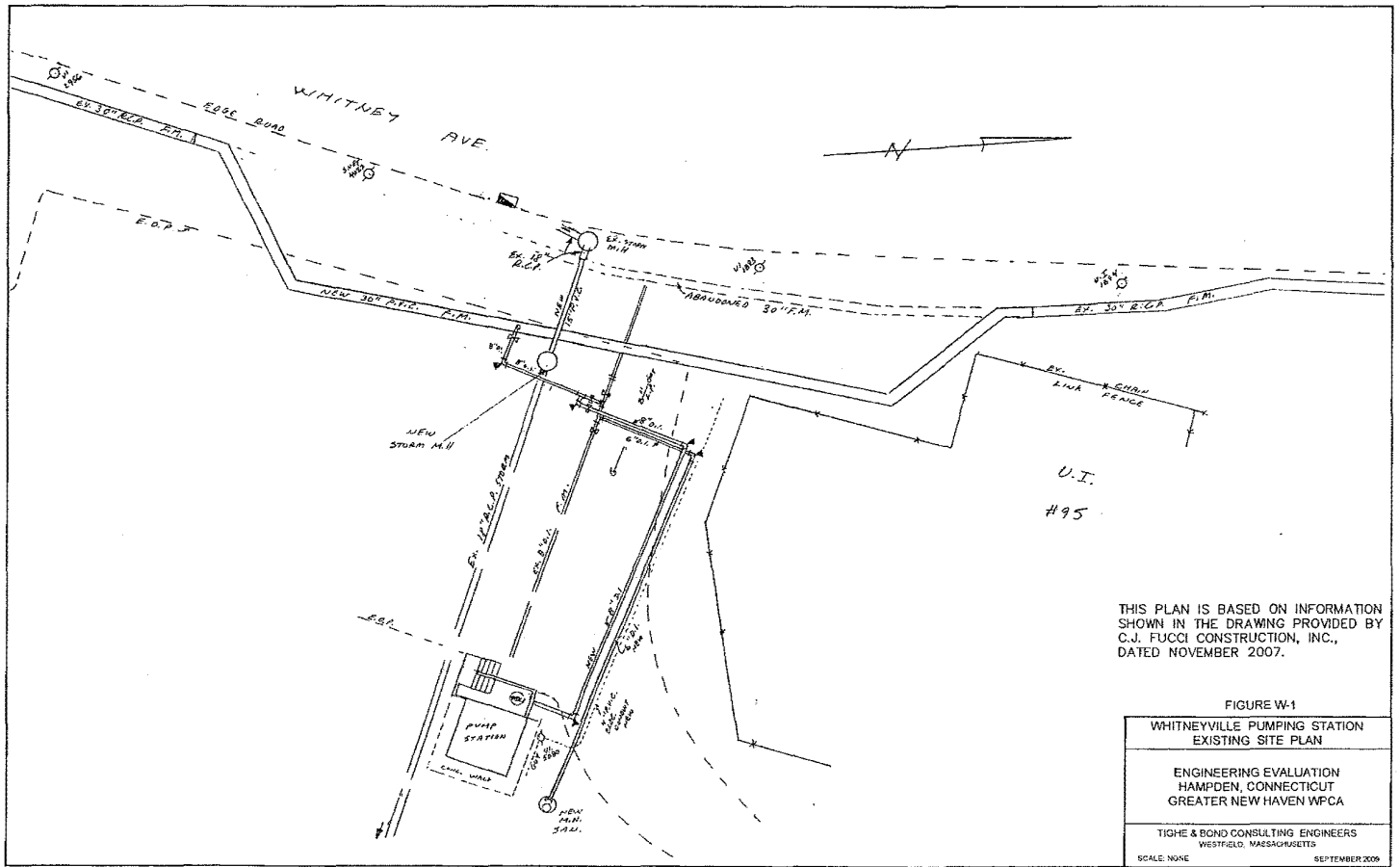










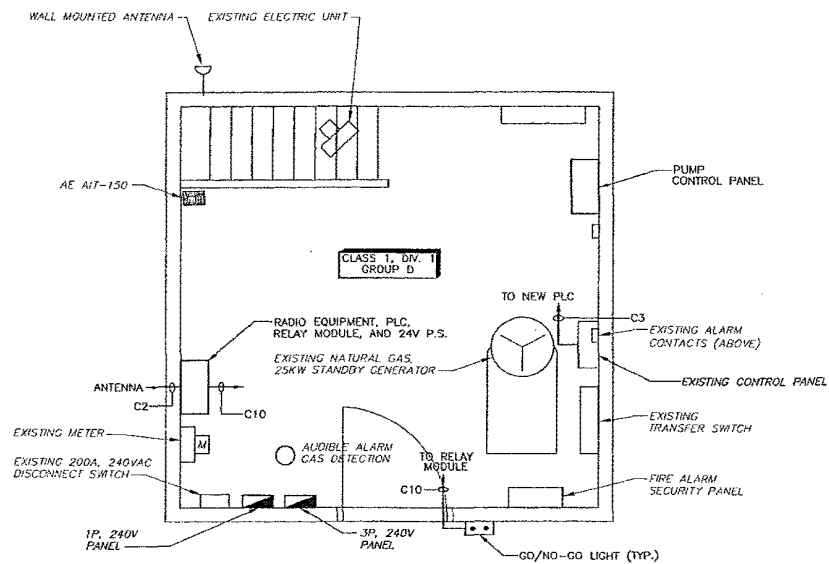


THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING PROVIDED BY C.J. FUCCI CONSTRUCTION, INC., DATED NOVEMBER 2007.

FIGURE W-1	
WHITNEYVILLE PUMPING STATION EXISTING SITE PLAN	
ENGINEERING EVALUATION HAMPDEN, CONNECTICUT GREATER NEW HAVEN WPCA	
TIGHE & BOND CONSULTING ENGINEERS WESTFIELD, MASSACHUSETTS	
SCALE: NONE	SEPTEMBER 2009

NG0508\whl\eng\figs\PS\W-1





# **PLAN**

N.T.S.

THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "REMOTE PUMP STATION SCADA UPGRADES AND NITROGEN REMOVAL PROCESS INSTRUMENTATION" BY CDM, DATED APRIL 2007.

FIGURE W-2

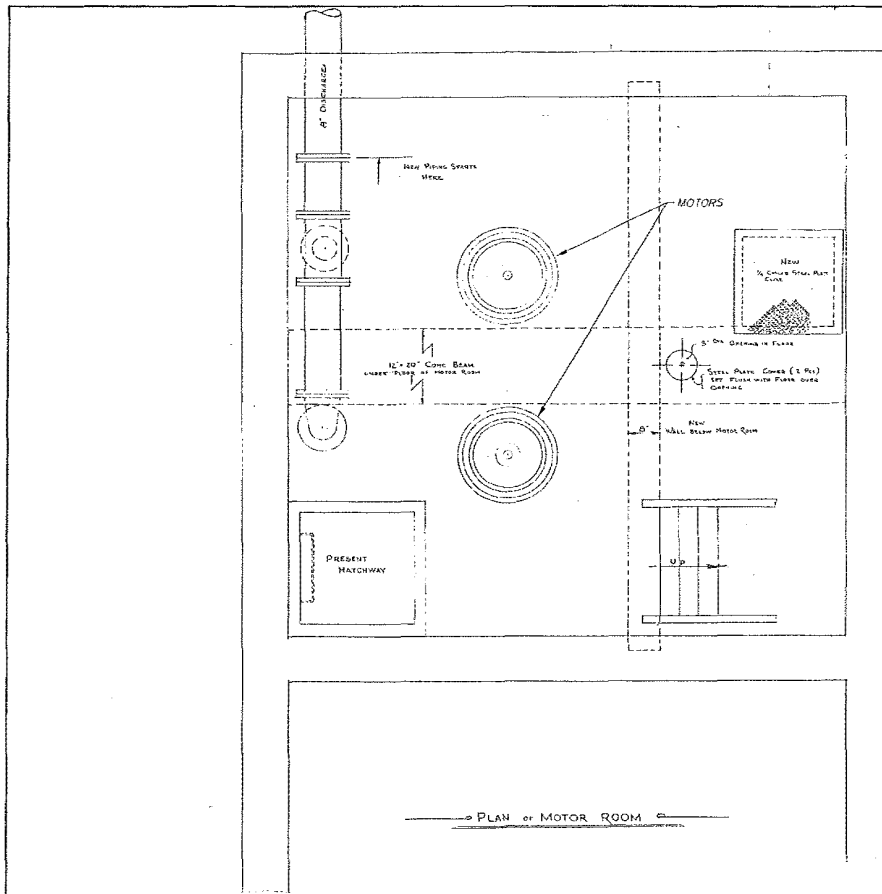
WHITNEYVILLE PUMPING STATION  
EXISTING BUILDING INTERIOR

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS

SCALE: NONE OCTOBER 2009

NEOS\Whitneyville PS\W-2



THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "ALTERATIONS TO WHITNEYVILLE PUMPING STATION" BY TOWN OF HAMDEN ENGINEERING DEPARTMENT, DATED JANUARY 20, 1947.

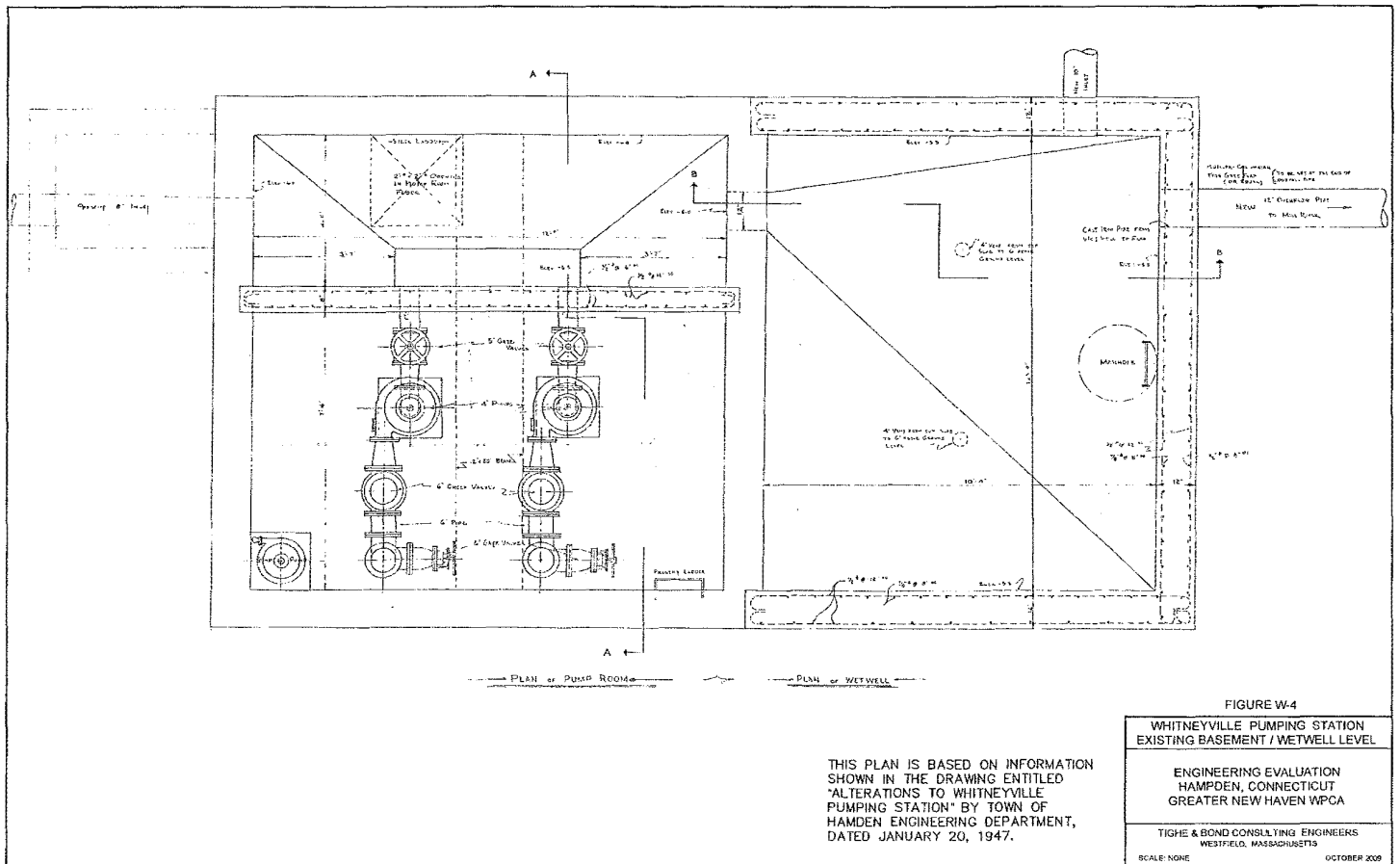
FIGURE W-3

WHITNEYVILLE PUMPING STATION  
EXISTING INTERMEDIATE LEVEL

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS  
SCALE: NONE  
OCTOBER 2008

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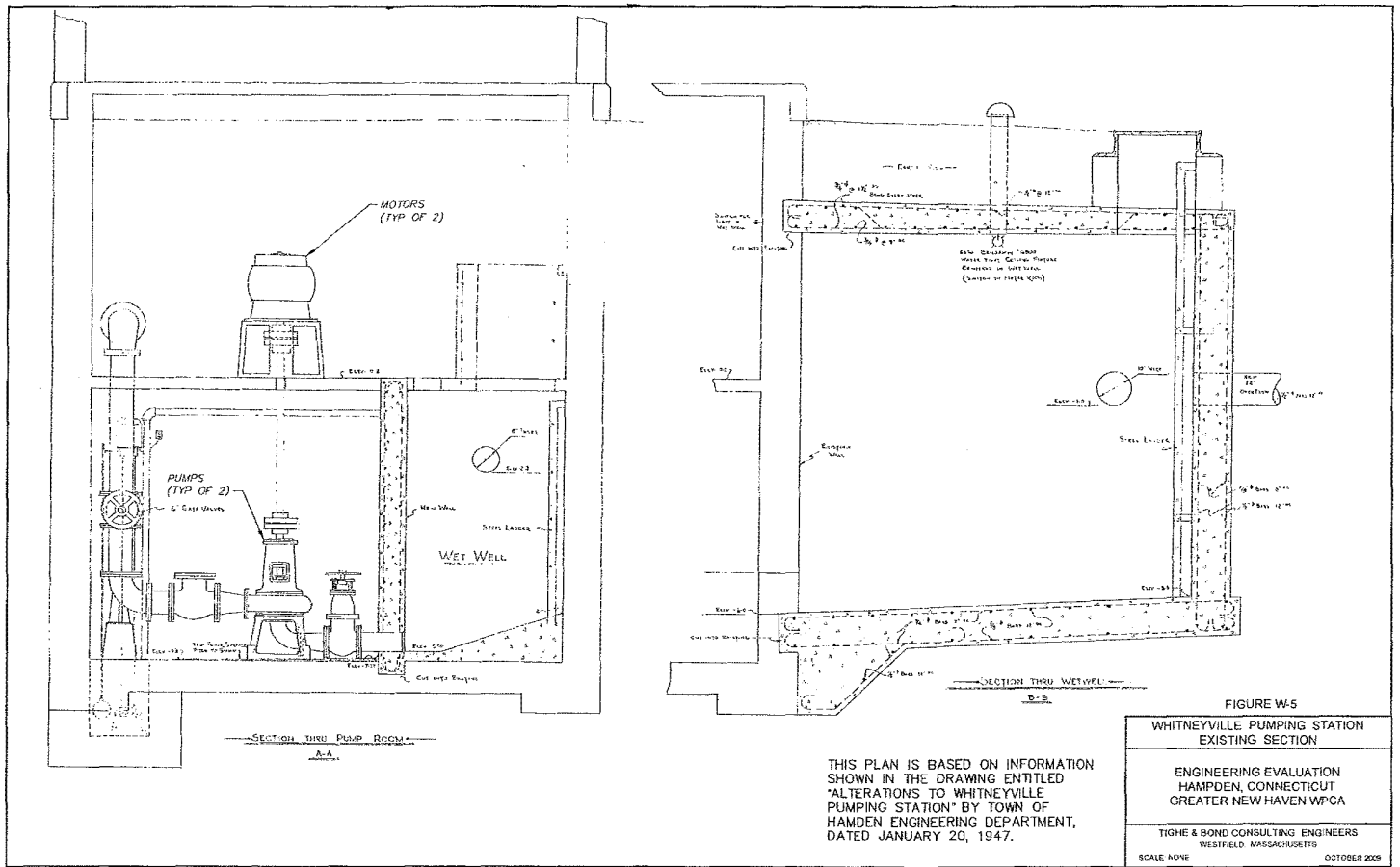


FIGURE W-5

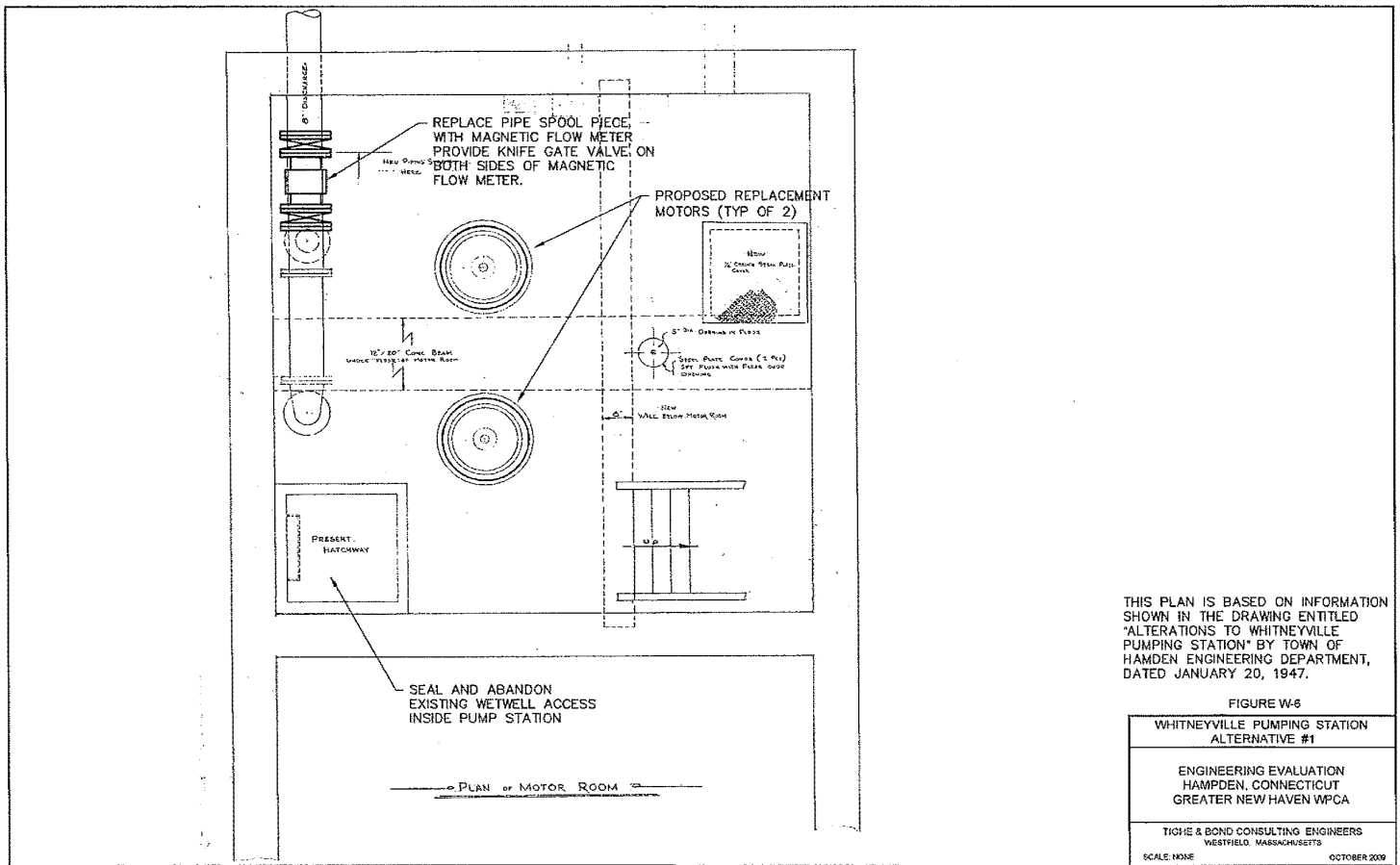
WHITNEYVILLE PUMPING STATION  
EXISTING SECTION

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS  
OCTOBER 2008

SCALE NONE

HC000\whitneyville PS\W-5



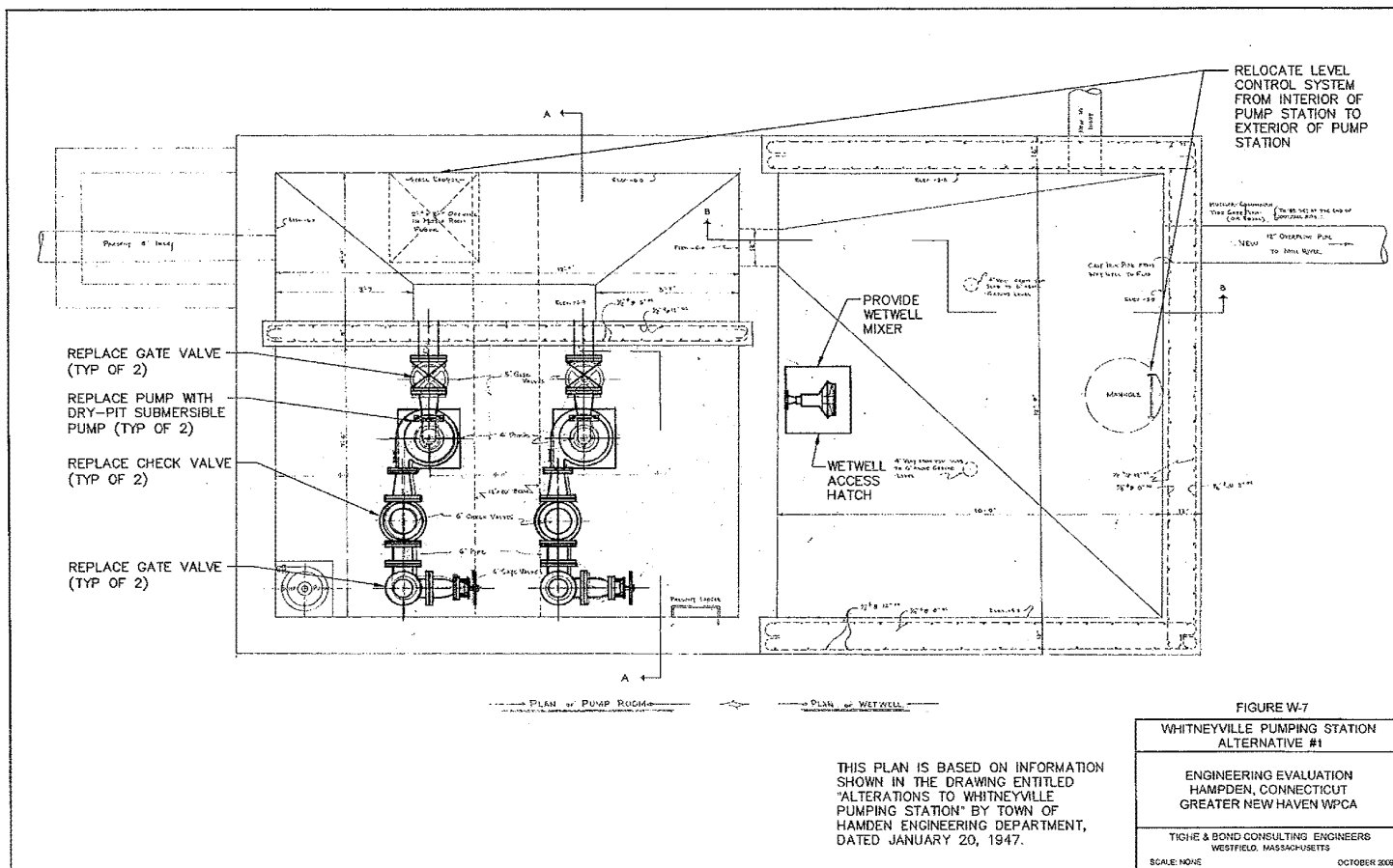


FIGURE W-7

WHITNEYVILLE PUMPING STATION  
ALTERNATIVE #1

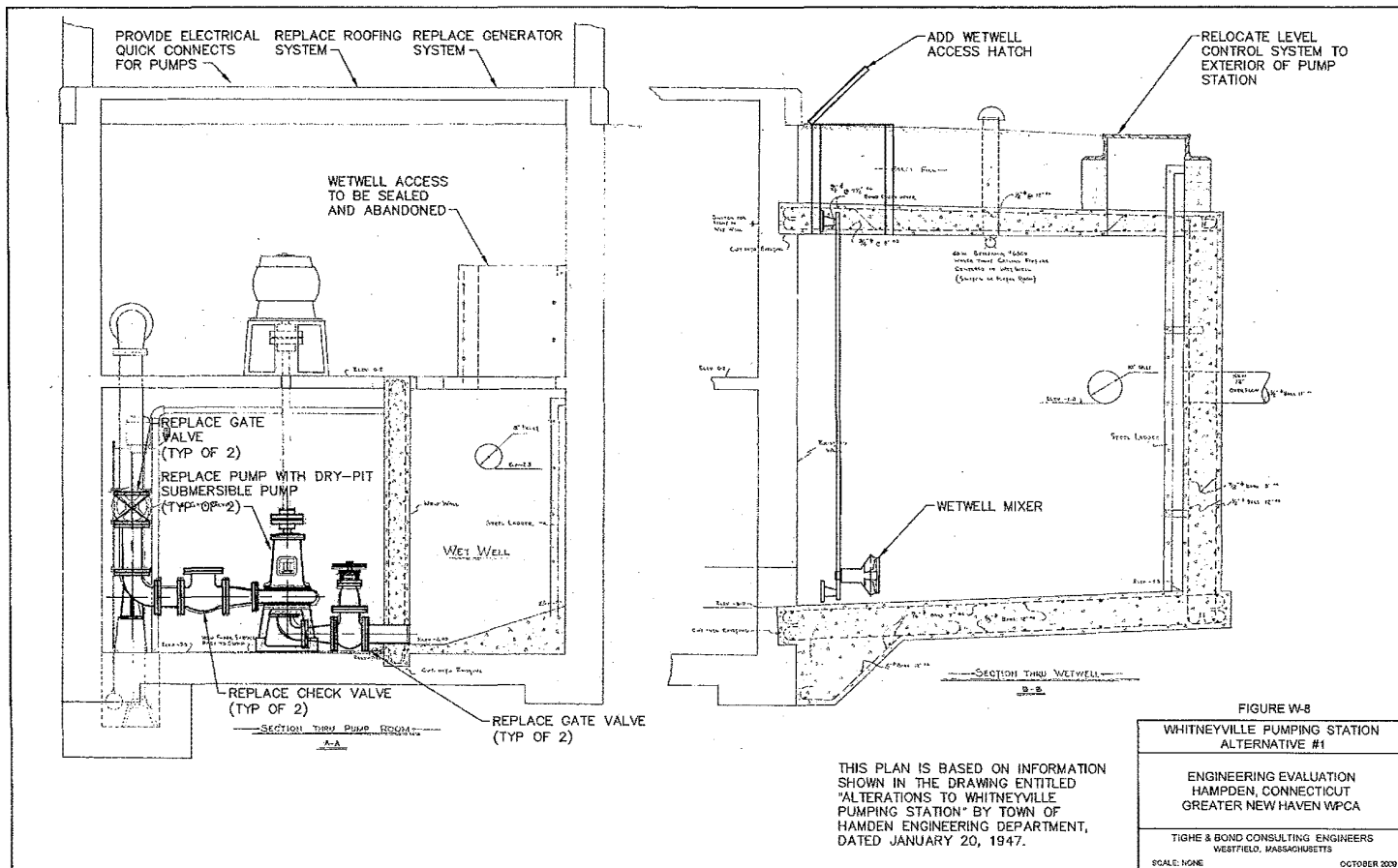
ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

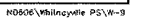
TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS

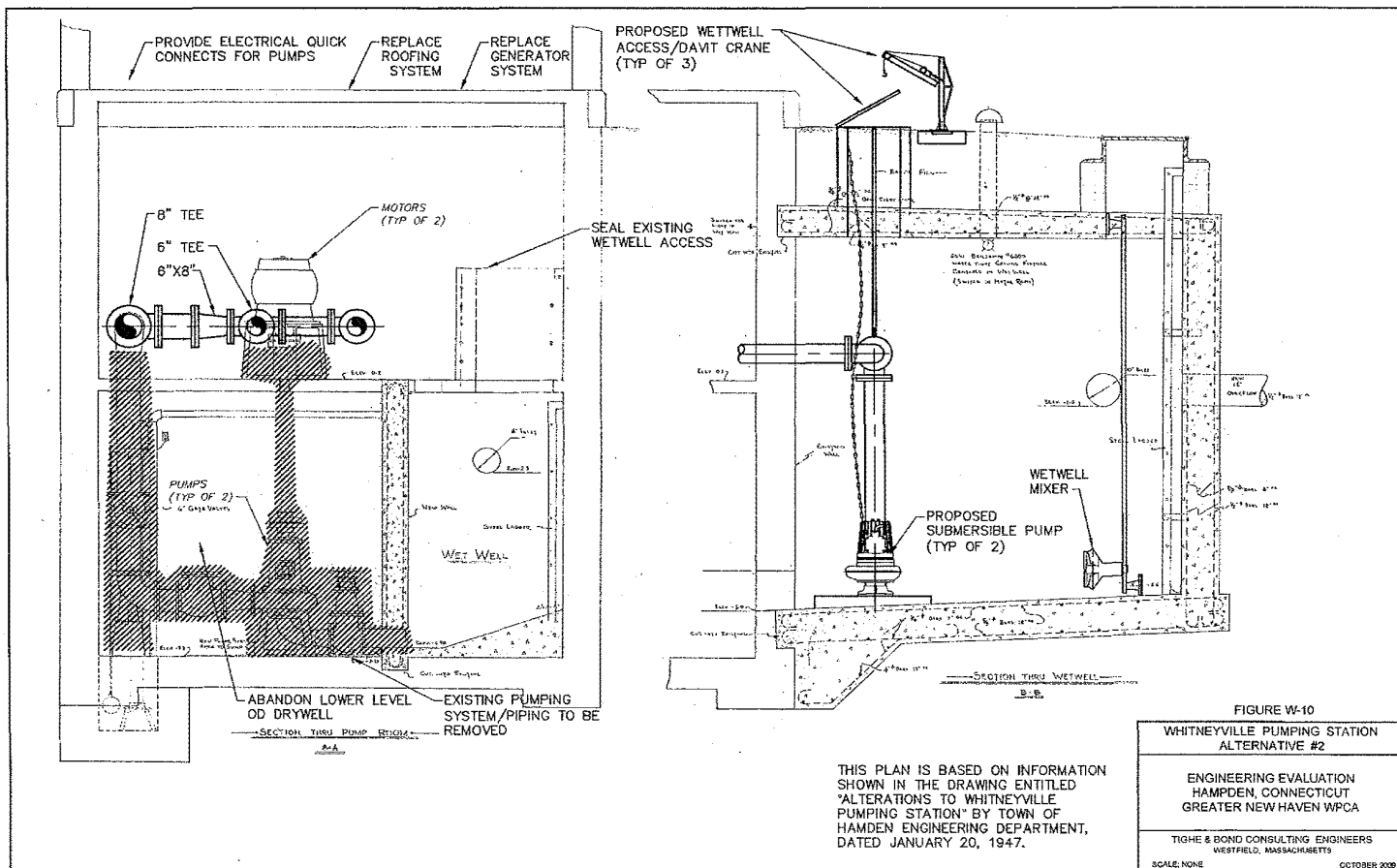
SCALE NONE OCTOBER 2009

105026\Whitneyville PS\W-7

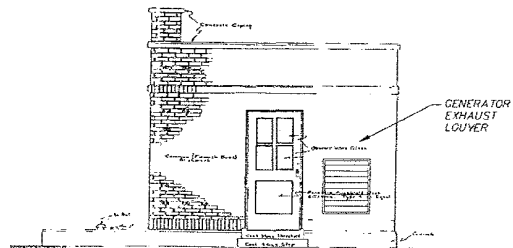




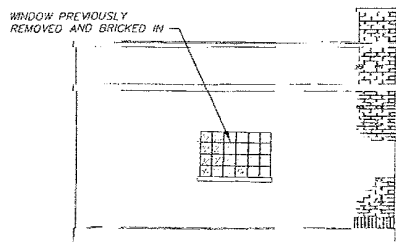




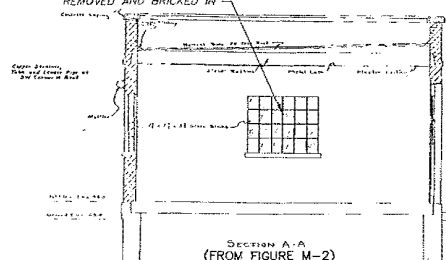




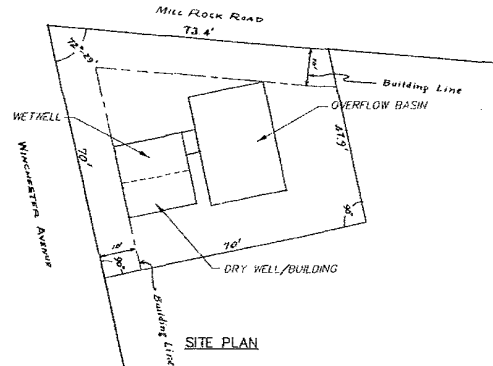
WEST ELEVATION



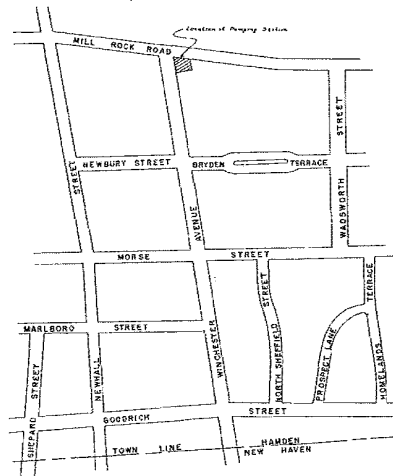
SOUTH SIDE ELEVATION



SECTION A-A  
(FROM FIGURE M-2)



SITE PLAN



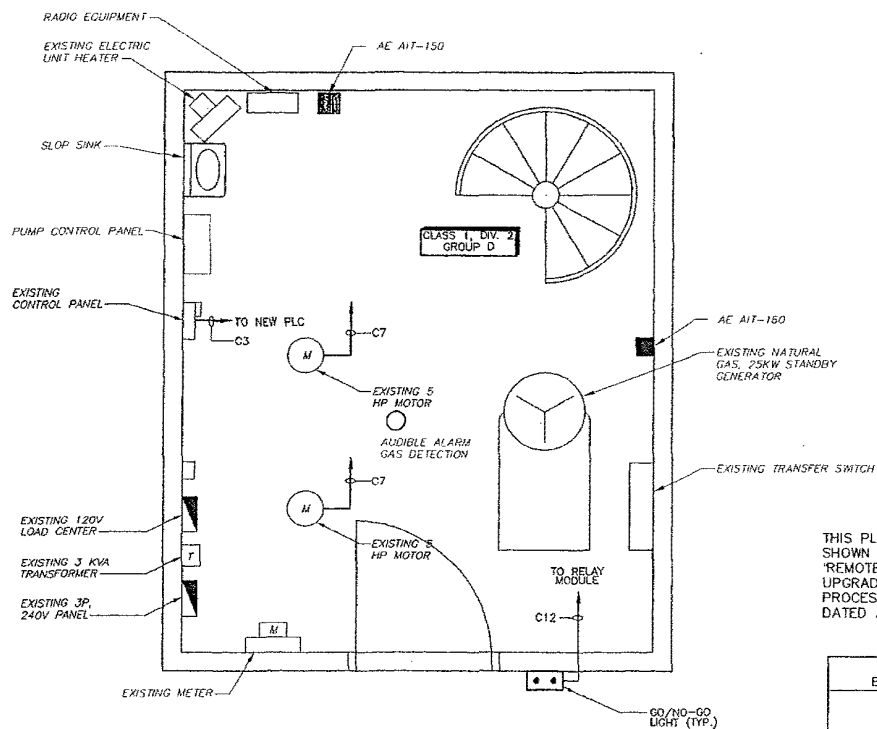
SITE LOCUS

THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "SEWAGE PUMPING STATION FOR MILL ROCK ROAD DISTRICT" BY TOWN OF HAMDEN ENGINEERING DEPARTMENT, DATED SEPTEMBER 4, 1951.

FIGURE M-1

MILL ROCK PUMP STATION EXISTING SITE PLAN AND BUILDING ELEVATIONS
ENGINEERING EVALUATION HAMPDEN, CONNECTICUT GREATER NEW HAVEN WPCA
TIGHE & BOND CONSULTING ENGINEERS WESTFIELD, MASSACHUSETTS
SCALE: NONE OCTOBER 2009

N0506/M2 Rock PS/M-1



**PLAN**  
N.T.S.

THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "REMOTE PUMP STATION SCADA UPGRADES AND NITROGEN REMOVAL PROCESS INSTRUMENTATION" BY CDM, DATED APRIL 2007.

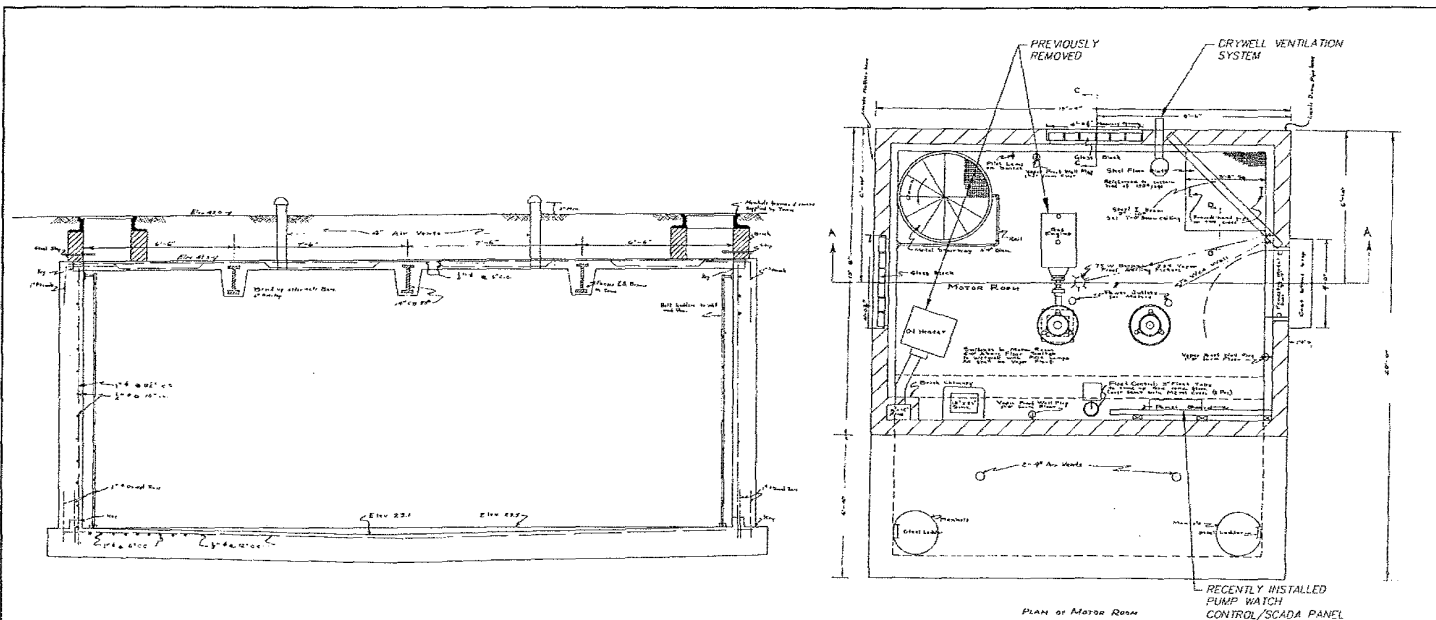
**FIGURE M-2**

**MILL ROCK PUMP STATION  
EXISTING BUILDING INTERIOR**

**ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA**

TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS  
SCALE NONE  
OCTOBER 2008

N28061M01 Rev. PS/M-2



SECTION THRU OVERFLOW BASIN

PLAN of Motor Room

RECENTLY INSTALLED  
PUMP WATCH  
CONTROL/SCADA PANEL

FIGURE M-3

MILL ROCK PUMP STATION  
EXISTING PLAN / WETWELL SECTION

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

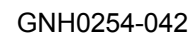
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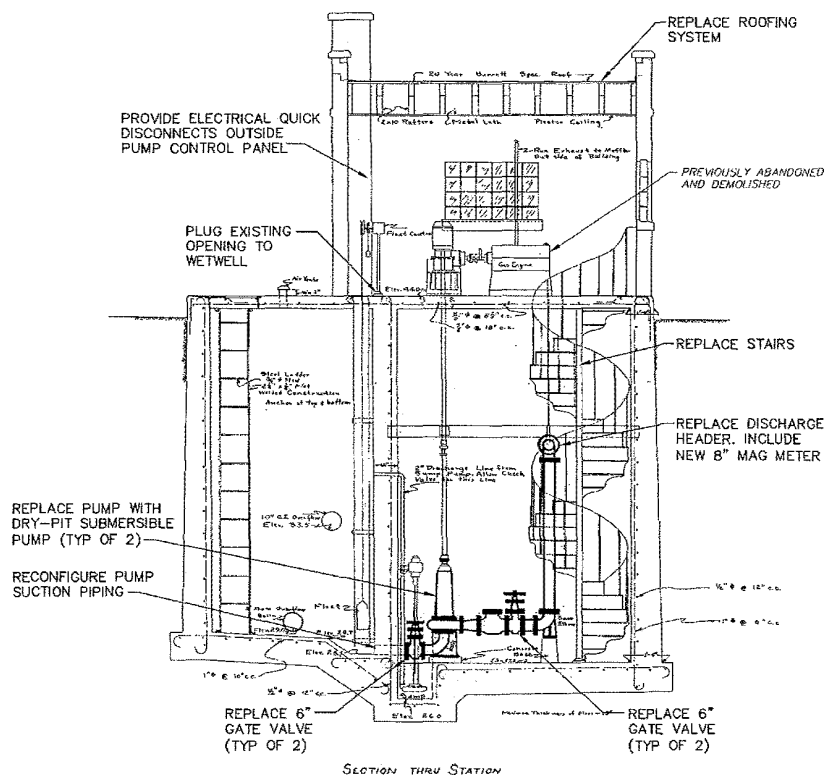
SCALE NONE OCTOBER 2008

MS0801W01 Rock PS/M-3

THIS PLAN IS BASED ON INFORMATION  
SHOWN IN THE DRAWING ENTITLED  
"SEWAGE PUMPING STATION FOR MILL  
ROCK ROAD DISTRICT" BY TOWN OF  
HAMPDEN ENGINEERING DEPARTMENT,  
DATED SEPTEMBER 4, 1951.







THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "SEWAGE PUMPING STATION FOR MILL ROCK ROAD DISTRICT" BY TOWN OF HAMDEN ENGINEERING DEPARTMENT, DATED SEPTEMBER 4, 1951.

FIGURE M-7

MILL ROCK PUMP STATION  
ALTERNATIVE #1

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

TIGHE & BOND CONSULTING ENGINEERS  
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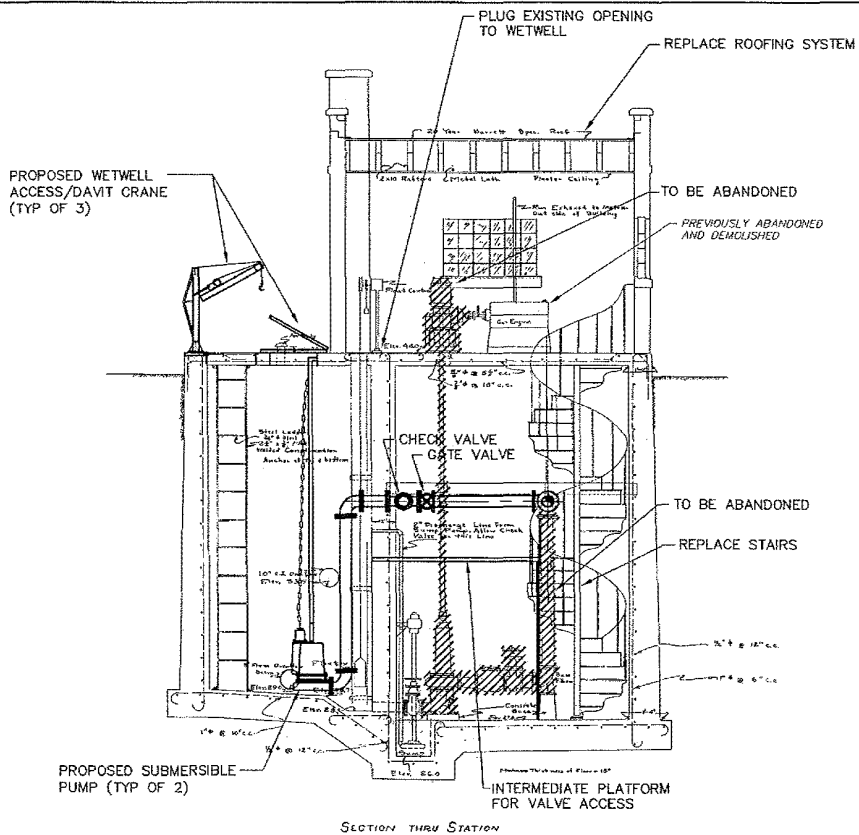
SCALE: NONE

OCTOBER 2008

NO008 Mill Rock PSTM-7







THIS PLAN IS BASED ON INFORMATION SHOWN IN THE DRAWING ENTITLED "SEWAGE PUMPING STATION FOR MILL ROCK ROAD DISTRICT" BY TOWN OF HAMDEN ENGINEERING DEPARTMENT, DATED SEPTEMBER 4, 1951.

FIGURE M-9

MILL ROCK PUMP STATION  
ALTERNATIVE #2

ENGINEERING EVALUATION  
HAMPDEN, CONNECTICUT  
GREATER NEW HAVEN WPCA

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WESTFIELD, MASSACHUSETTS

SCALE: NONE OCTOBER 2009

N09001045 Mill Rock PS/M-9